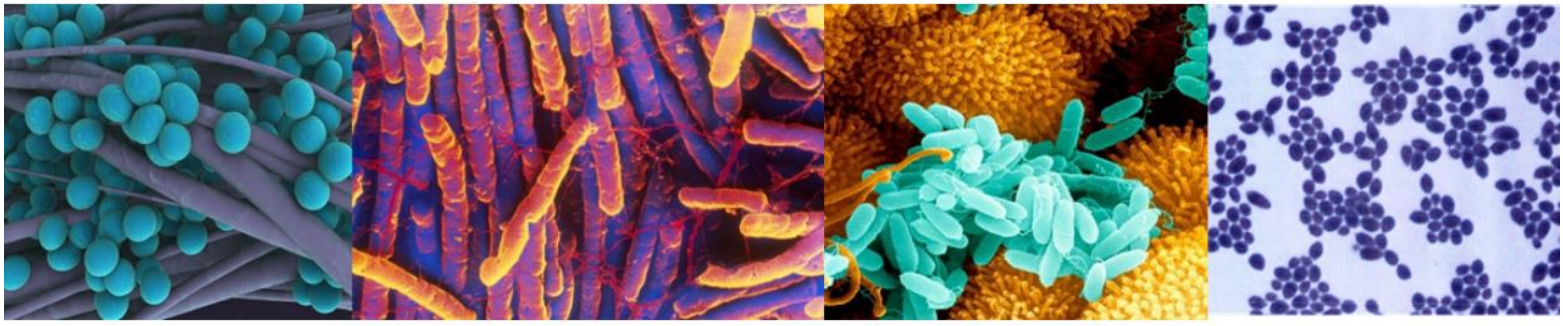
Healthcare-Associated Infections in Colorado



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Colorado Healthcare-Associated Infections Advisory Committee

Subject: Report to the legislature concerning the status of healthcare-associated infections in Colorado

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Additional information

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Executive summary

This report presents data on healthcare-associated infections (HAI) reported by Colorado health facilities. HAI are infections that patients acquire during treatment for other conditions within a health care setting. They include infections associated with surgeries, central lines and dialysis treatment. HAI can be devastating to patients and families, causing a significant financial burden due to additional medications, treatments, procedures, lost wages, short- and long-term illnesses, as well as pain, suffering and death.[1] Recognizing the seriousness of HAI, Colorado passed the HAI Disclosure Law (House Bill 06-1045) in 2006. This statute requires acute care hospitals, rehabilitation hospitals, long-term acute care hospitals, selected hospital units, ambulatory surgery centers (ASC) and outpatient dialysis treatment centers to report designated HAI data as a condition of their state licensure.

This report fulfills reporting requirements set forth in the disclosure law and is the tenth annual report published by the Colorado Department of Public Health and Environment. It is submitted each year to the Colorado Legislature by January 15. The report presents information about HAI reporting requirements, processes and limitations; functions of implementing the disclosure law; and HAI data submitted by Colorado health care facilities on surgical site infections (SSI), central-line associated bloodstream infections (CLABSI), Clostridium difficile infections (CDI) and dialysis-related infections. HAI data presented in this report are for the current year, Aug. 1, 2015 through July 31, 2016, and two previous reporting periods.

Key findings described in this report include the following:

- Of reportable surgeries in Colorado, the three most common surgeries performed continue to be knee replacements (n=15,819 in hospitals, 701 in ASC), breast procedures (n=10,983 in hospitals, 5,840 in ASC) and hip replacements (n=10,611 in hospitals, 379 in ASC).
- Most Colorado health facilities had HAI rates similar to national rates for most reportable HAI.
- This year, the statewide SSI rate for coronary artery bypass surgeries was better than the national average.
- Statewide aggregate SSI rates for colon surgeries, abdominal hysterectomies, and knee replacements done in hospitals were better than national rates over the last four years.
- Statewide aggregate SSI rates for hernia repairs performed in ASC have been better than national rates for the last four years.
- The statewide SSI rate for breast surgeries performed in hospitals was similar to the national average, an improvement from the previous three years, when rates were worse.
- ASC traditionally report fewer SSI than hospitals, which may be due in part to reduced opportunity to conduct post-surgical follow-up with patients and surgeons. Over the last three years, the number of SSI reported by ASC has declined.
- CLABSI rates for all unit and facility types were similar to national rates this year.
- The numbers and rates of dialysis related infections has improved over the last three years.
- The statewide aggregate rate for CDI has been worse than the national rate for the last two years.

Table 1: Healthcare-Associated Infections Summary Table
Colorado, August 2015-July 2016

Healthcare-associated infection Type	No. of Facilities Reporting Data	No. of Facilities Reporting Zero Infections	No. of Facilities *Better* than National Rate	No. of Facilities *Worse* than National Rate	Comparison: Colorado to National Rate
Surgical Site Infections in Acute Care Hospitals Procedure Type					
Breast Surgery	59	15	0	5	Same
Colon Surgery	57	3	3	1	Better
Coronary Artery Bypass	15	5	1	0	Better
Hip Replacement	60	12	4	1	Same
Knee Replacement	61	20	3	0	Better
Abdominal Hysterectomy	58	12	3	1	Better
Surgical Site Infections in ASCs Procedure Type					
Breast Surgery	35	20	0	0	Same
Hernia Repair	33	18	0	0	Better
Hip Replacement	4	0	0	0	Same
Knee Replacement	10	4	0	0	Same
Vaginal Hysterectomy	3	1	0	0	Same
Central Line-Associated Bloodstream Infections Facility/Unit Type					
Adult Critical Care Units	59	22	0	2	Same
Neonatal Critical Care Units	18	7	0	1	Same
Long Term Acute Care Hospitals	8	1	0	0	Same
Inpatient Rehabilitation Hospitals or Wards	17	15	0	0	Same
Dialysis Related Infections Infection Type					
Access Related Bloodstream Infections	72	13	0	3	Same
Local Access Infections	72	9	National rate not yet available		
***Clostridium difficile* Infections in Acute Care Hospitals**					
Facility Wide-Lab ID'd	48	5	4	7	Worse

While this report only includes information on a subset of HAI, the information provided can be used as an important indicator of health care quality and infection prevention efforts in Colorado facilities. Beyond the number and rate of HAI for each facility, consumers can see the volume of procedures performed at each facility, which can be an indicator of experience and practice.

The Colorado Department of Public Health and Environment continues work to reduce HAI in Colorado through various activities, including the tracking and publishing of HAI data, completion of HAI data validation studies, implementation of HAI prevention collaboratives, direct observation of facility practices, maintenance of communication vehicles for HAI-related information and collaboration with internal and external partners committed to patient safety. Ideally, health care facilities will use the data in this report to target and improve infection prevention efforts, and consumers will use the data to make informed health care choices.

Introduction

Healthcare-associated infections (HAI) are infections that patients acquire during treatment for other conditions within a health care setting. Examples of HAI include, but are not limited to infections associated with surgeries, central lines and dialysis treatment. HAI can be devastating to patients and families, causing significant financial burden due to additional medications, treatments, procedures, lost wages, short- and long-term illnesses, as well as pain, suffering and death.[1] Colorado recognizes the seriousness of this public health threat and passed HAI reporting legislation in 2006. Colorado's HAI Disclosure Law (House Bill 06-1045) requires hospitals, including acute care, rehabilitation, and long-term acute care hospitals, hospital units, ambulatory surgery centers and dialysis treatment centers to report designated HAI data as a condition of state licensure.

The disclosure law mandates certain health care facilities report their HAI data through the National Health Care Safety Network (NHSN)[2], a national web-based surveillance and reporting system managed by the Centers for Disease Control and Prevention (CDC). The use of NHSN potentially improves the validity of reported HAI data because facilities must use standard definitions and reporting rules. Reporting consistency allows facility HAI data to be compared to national rates and be more easily understood by health care facilities and the public.

As consumer demand for HAI-related information has increased, policymakers nationwide have acknowledged the need for publishing HAI data in consumer-focused health care quality reports. This report is the tenth annual report published by the Colorado Department of Public Health and Environment's Health Facility Infection Surveillance Unit (formerly known as the Patient Safety Program) and is due to the Health and Human Services Committees of the Colorado Senate and House of Representatives on Jan. 15, 2017.

The report presents information about HAI reporting requirements, processes and limitations; functions of implementing the disclosure law; and HAI data submitted by Colorado health care facilities on selected surgical site infections (SSI), central line-associated bloodstream infections (CLABSI), *Clostridium difficile* infections (CDI) and dialysis-related infections. The SSI data presented in this report were submitted for patients having surgeries between Aug. 1, 2013 and July 31, 2016. The CLABSI, dialysis-related infection data and CDI data presented is for patients receiving medical treatment between Aug. 1, 2013 and July 31, 2016. For all HAI presented in this report, the current reporting year is Aug. 1, 2015 through July 31, 2016.

HAI disclosure law

Implementing Colorado's HAI Disclosure Law involves four main functions, as described below:

1. Appointment and coordination of an HAI advisory committee;
2. Selection of clinical metrics;
3. Oversight and validation of data entered into NHSN, and;
4. Reporting results.

Appointment and coordination of an HAI advisory committee

Advisory committee members

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Carole Hemmelgarn, MS
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Fresenius Kidney Care

Heather Young, MD
Denver Health Medical Center

Colorado's disclosure law requires the department's executive director to appoint an 11-member HAI advisory committee, the Colorado Healthcare-Associated Infections Advisory Committee, with the following composition: one representative each from a rural and urban hospital; a representative of a health insurer; a consumer/purchaser of health insurance; a representative of a health consumer organization; four infection control practitioners (one from a stand-alone ambulatory surgery center, one certified in infection control and epidemiology, one from a long-term care setting, and one other health care professional); a board-certified or board-eligible physician licensed in Colorado, affiliated with a Colorado hospital or medical school, and an active member of a national organization specializing in health care epidemiology or infection control; and a Master or PhD level medical statistician or clinical microbiologist.

The committee's mission is to provide oversight of legislatively mandated HAI reporting to ensure accountability and improvement of patient health care through education, validation of data and review of reporting requirements and surveillance practices. The committee's goals are to:

- Ensure all components of the Colorado disclosure law are implemented;
- Provide guidance in selecting HAI reporting metrics;
- Evaluate relevancy and accuracy of reporting requirements;
- Establish priorities for completing data validation studies;

- Provide input on outreach activities, research projects and other HAI-related projects as needed;
- Provide guidance regarding the annual report and other reports developed for consumers and health care personnel, and;
- Promote safe health care for Colorado citizens.

Selection of clinical metrics

The HAI reporting metrics selected include infections related to central lines, surgeries and outpatient dialysis treatment. Central line-associated bloodstream infections (CLABSI) are associated with the presence of central lines in patients. A central line is an intravascular catheter (tube in a vein) that terminates at or close to the heart or in one of the great vessels (e.g., aorta, superior vena cava). Central lines, which may be temporary or permanent, are used to infuse fluids and medications, withdraw blood or monitor fluid volume in patients. The surgeries for which surgical site infections (SSI) are reported were selected based on their high volume and risk for infection. Dialysis related infections include bloodstream infections and localized infections of the vascular access site. Dialysis is a method for removing waste products and fluid from a patient's blood when the kidneys are failing. Because of frequent hospitalizations and weakened immune systems, dialysis patients are at high risk for infection.

Clostridium difficile infection (CDI) is a diarrhea disease that generally occurs in patients exposed to health care and antibiotics. It is caused by overgrowth of C. difficile in the colon and continues to be a growing problem, causing an estimated 14,000 deaths each year. Based on its high incidence and potential severity, Colorado's HAI Advisory Committee added CDI to state reporting requirements for acute care hospitals in 2014. Table 2 below depicts Colorado's selected reporting metrics. In selecting metrics, the following factors were considered:[3]

- Impact – extent to which the infection affects the patient or family (disability, mortality and economic costs);
- Improvability – extent to which reporting infection improves practice to prevent the infection;
- Inclusiveness – range of individuals affected by the infection type (e.g., age, gender, socioeconomic status and ethnicity/race);
- Frequency – how often the infection occurs;
- Feasibility – ability for the data to be collected with minimal burden on the facilities;
- Functionality – extent to which the intended audience (patients, care providers and hospital administrators) can understand and apply the results.

Table 2: Colorado Healthcare-Associated Infection Reporting Metrics

Facility Type	Reported HAI	Reporting Hospital Unit(s)
Acute Care and Critical Access Hospitals	• Breast Surgical Site Infections (SSI) • Colon SSI • Coronary Bypass Graft SSI • Hip Replacement SSI • Knee Replacement SSI • Hysterectomy Abdominal SSI	Inpatient and Outpatient Operating Rooms
	• Central Line-Associated Bloodstream Infections (CLABSI)	Adult Critical Care Units
		Neonatal Critical Care Units Level II/III and III
		Inpatient Rehabilitation Units
	• *Clostridium difficile* infections*	Facility-Wide Inpatient
Rehabilitation Hospitals and Long-Term Acute Care Hospitals	• CLABSI	Facility-Wide Inpatient
Ambulatory Surgery Centers	• Breast SSI • Hernia Repair SSI • Hip and Knee Replacement SSI • Hysterectomy Abdominal SSI • Hysterectomy Vaginal SSI	Not Applicable
Outpatient Dialysis Centers	• Dialysis Events	Not Applicable

*Acute care hospitals only, excluding critical access hospitals (defined in Appendix C glossary) and stand-alone children's hospitals.

Oversight and validation of data entered into NHSN

Colorado health facilities grant the Colorado Department of Public Health and Environment access to the data they enter into the NHSN so the department can monitor, analyze and produce public reports. The NHSN maintains stringent controls to ensure data security, integrity and confidentiality, and also has the capacity to enable facilities to share data in a timely manner with each other and with public health agencies.

Colorado's disclosure law requires health facilities to report HAI data within 30 days of each month's end, and the department provides guidance and technical assistance to ensure the timely and accurate reporting of data. The department also performs systematic monitoring and validation of the HAI data submitted, which allows for the identification and correction of incomplete and incorrectly entered data. The department has completed data validation studies for CLABSI, SSI and dialysis-related infections and will conduct validation studies of additional infections as funding and staffing permit. See Appendix A for a description of validation studies and HAI prevention projects completed or underway.

The disclosure law also specifies requirements for health care facility employees who collect and report HAI data. These individuals must be certified in infection control and epidemiology[4] or become certified within six months after becoming eligible to take the certification test as recommended by the Certification Board of Infection Control and Epidemiology, Inc., or its successor. These certification requirements do not apply to staff in hospitals with 50 or fewer beds, dialysis centers, ASC, or long term care facilities. However, staff members in these facilities must complete specified NHSN educational programs before enrolling in NHSN, complete 10 hours of relevant infection prevention education annually and maintain a log of the completed education.

Reporting results

The final function of implementation is the publication of annual public reports and semi-annual bulletins. The current report is the tenth annual report published by the department. Semi-annual bulletins provide additional data, research, and information applicable to HAI in Colorado. All HAI reports and bulletins can be found at colorado.gov/cdphe/health-care-facility-infection-data

Participating facilities

This past year, 77 hospitals, eight long term acute care hospitals (LTAC), five rehabilitation hospitals, 58 ASC and 72 dialysis treatment clinics reported HAI data into NHSN. Table 3 shows the number of hospitals that report CLABSI by type of critical care unit, and Table 4 lists Colorado's reportable surgical procedures and the numbers of hospitals and ASC that report them.

Table 3: Number of Hospitals Reporting Central Line-Associated Bloodstream Infections (CLABSI) by Type of Critical Care Unit – Colorado, August 2015-July 2016

Type of Critical Care Unit	Number of Hospitals
Medical	5
Surgical	1
Medical/Surgical	44
Medical Cardiac	3
Cardiothoracic surgery	3
Burn	0
Trauma	2
Neurosurgical	3
Level II/III Neonatal Critical Care	13
Level III Neonatal Critical Care	5
Long-term Acute Care Hospitals	8
Inpatient Rehabilitation Hospitals	5
Inpatient Rehabilitation Hospital Units	12

Table 4: Number of Hospitals and Ambulatory Surgery Centers Performing Reportable Procedures – Colorado, August 2015-July 2016

Procedure	Number of Hospitals	Number of Ambulatory Surgical Centers	Total Number of Facilities
Breast Surgery	59	35	94
Colon Surgery	57	NA[2]	57
Coronary Artery Bypass Graft	15	NA[2]	15
Hernia Repair	NA[1]	33	33
Hip Replacement	60	4	64
Knee Replacement	61	10	71
Hysterectomy Abdominal	58	NA[2]	58
Hysterectomy Vaginal	NA[1]	3	3

NA = Not applicable

[1] Hospitals no longer report hernia repairs and vaginal hysterectomies.

[2] Ambulatory Surgery Centers do not perform these procedures.

Data format and cautions

Data presented in this report address SSI in patients undergoing surgeries between Aug. 1, 2013 and July 31, 2016; and CLABSI, dialysis-related infections and Clostridium difficile infections in patients receiving medical care between Aug. 1, 2013 and July 31, 2016. The current year is Aug. 1, 2015 through July 31, 2016. Two forms of HAI data are presented: infection rates that combine all Colorado facilities (aggregate data) and infection rates for each individual facility (facility-specific data). The report further classifies HAI data by procedure and/or device so that facilities can readily identify areas in need of process improvements and target infection prevention efforts.

The following data tables include the facility name and city, and for each facility, the number of infections and depending on the type of infection, the number of surgeries (for SSI), patient line days (for CLABSI), patient months (for dialysis-related infections), and patient days (for CDI). Most tables present a Standardized Infection Ratio (SIR), which is a summary measure that describes the infection prevention performance of a facility or region while considering the risk of that facility or region's patient population.

The SIR is a ratio that compares a facility's observed number of infections to the expected number of infections based on the national average (as determined by historical data collected by the NHSN). A SIR of 1 means that a facility's observed number of infections is equal to the expected number of infections. If the SIR value is greater than one, there are more infections than expected, and if the SIR is less than one, there are fewer infections than expected.

In this report, the SIR is reported for all infection types except dialysis local access infections, because a national rate for this type of infection is not yet available.

National comparison. For all types of infections in this report, a national comparison is shown for each facility, which compares the facility's observed number of infections to the expected number of infections based on the national rate, denominator size (i.e., number of procedures, number of patient months, etc.) and a statistical test of difference between numerical values. The statistical test, known as a Poisson test, calculates the magnitude of difference between a facility's observed and expected number of infections. If there is no significant difference between the facility's observed and expected number of infections, the facility's infection rate is designated as "SAME." If the difference is statistically significant and the SIR is greater than one, the facility has significantly more infections than expected and is designated as "WORSE." If the difference is statistically significant and the SIR is less than one, the facility has significantly fewer HAI than expected and is designated as "BETTER." For a more detailed explanation of how the SIR is calculated, see Appendix B.

Cautions. The Colorado Department of Public Health and Environment and the Colorado HAI Advisory Committee recommend caution be used when drawing conclusions from these data for multiple reasons. For one, direct comparisons between facilities may not provide the most accurate assessment because infection rates are influenced by the types of patients treated. Facilities that

treat higher volumes of severely ill patients may have higher infection rates regardless of their prevention efforts. While the NHSN system provides the best risk adjustment possible to account for this at present, there always will be patient risk factors that cannot be measured (e.g., individual ability to heal, smoking cessation days), that contribute to infection risk.

Second, NHSN surveillance manuals are developed by CDC subject matter experts. Although the definitions and criteria are updated each year, they can be challenging to apply to patients with complicated medical histories. Additionally, facilities use different surveillance techniques to find infections. Some infection preventionists have more resources for surveillance, thus may find and report more infections than other facilities. In those cases, higher infection rates may be based on better surveillance practices rather than poor infection control practices. It is noteworthy that ambulatory surgery centers (ASC) traditionally report lower numbers of SSI than hospitals, which may be due, in part, to reduced opportunity to conduct post-surgical follow-up with patients and surgeons.

Finally, users of this report should note that the data presented are self-reported by each facility and that data validation studies have only been completed thus far for selected CLABSI, SSI and dialysis-related infections. It is recommended that conclusions regarding health care quality be made in conjunction with other quality indicators and that consumers consult with doctors, health care facilities, health insurance carriers, health care websites from reputable sources (e.g., Hospital Compare, Colorado Hospital Report Card, Leap Frog), and with their families and friends before deciding where to receive care. Ideally, facilities will use the data in this report to target and improve infection prevention efforts, and consumers will use the data to make more informed health care decisions.

Colorado aggregate healthcare-associated infections data

Aggregate surgical site infection data

Surgical site infections (SSI) are infections directly related to a surgical procedure. Table 5 below shows the statewide aggregate number of SSI and SIRs for reportable procedures by three separate twelve-month reporting periods from Aug. 1, 2013 through July 31, 2016. The current year is Aug. 1, 2015 through July 31, 2016. SSI data are presented for both hospitals and ASC.

> This year's statewide SSI rate for breast surgeries in hospitals was similar to the national rate, an improvement from prior years.

Hospitals. For the last four years (note that only three years of data are presented in this report), statewide SSI rates in Colorado hospitals have had better than national SSI rates for colon surgeries, knee replacements and abdominal hysterectomies. This year, the statewide SSI rate for coronary artery bypass surgeries also was better than the national rate. Moreover, after being worse than national rates in the previous three years, this year's statewide SSI rate for breast surgeries in hospitals was similar to national rates.

> The statewide SSI rate for hernia repairs in ASC has remained better than national rates. Vaginal hysterectomies performed in ASC have had zero SSI since reporting began.

Ambulatory surgery centers. In general, ASC reported lower rates of SSI than hospitals and performed the same or better than national averages. Breast and hernia surgeries were the most common procedures reported by ASC, and the statewide aggregate SSI rate for breast surgeries was the same as the national average. For hernia repairs in ASC, the statewide SSI rate has been better than national rates for the last four years. Hip and knee replacements in ASC each had two SSI statewide, while vaginal hysterectomies in ASC have had zero SSI in the last four years.

Aggregate CLABSI data

Central line-associated bloodstream infections (CLABSI) are associated with specific intravascular catheters used to infuse fluids or medications, withdraw blood or monitor fluid volume in patients. Table 6 shows the statewide aggregate CLABSI central line days, infection counts and SIRs for adult critical care units, neonatal critical care units, long-term acute care hospitals (LTAC), rehabilitation hospitals and rehabilitation wards in Colorado from Aug. 1, 2013 through July 31, 2016. The current year is Aug. 1, 2015 through July 31, 2016.

Statewide, Colorado's CLABSI rates in hospital critical care units have been similar to national averages for the last four years. For the current year, the statewide CLABSI rate in LTAC was similar to the national rate, after being better than the national rate in the previous two years. This year's statewide CLABSI rate for neonatal critical care units (NCCU) was also similar to the national rate, after being worse than the national rate last year.

The statewide CLABSI rate for neonatal critical care units was similar to the national rate, after being worse than the national rate last year.

Aggregate dialysis infection data

Table 7 shows statewide aggregate data for access-related bloodstream infections (ARB) and local access infections (LAI) in Colorado outpatient dialysis centers from Aug. 1, 2013 through July 31, 2016. An ARB, which poses more serious health implications and requires higher levels of care, is determined by the presence of a germ identified in a blood culture, and the source of infection is reported as the vascular access site. An LAI is defined as the presence of pus, redness or swelling of the vascular access site without the presence of an ARB.

Numbers and rates of dialysis access-related bloodstream infections and local access infections have improved over the last three years.

Colorado's aggregate ARB rate has been similar to the national average for the last two years. While the statewide LAI rate showed a decline when compared to the two previous reporting periods, national LAI rates are not yet available to provide comparisons. Numbers and rates of infections for both ARB and LAI have improved over the last three years.

Aggregate *Clostridium difficile* infection data

Clostridium difficile is a spore-forming bacterium that can cause symptoms ranging from bloating, diarrhea, fever and abdominal pain to life-threatening colon inflammation, sepsis and death. Table 8 shows statewide aggregate data for hospital onset *Clostridium difficile* infections (CDI) in Colorado acute care hospitals from Aug. 1, 2013 through July 31, 2016 (CDI data were not available before Jan. 1, 2013). The statewide *Clostridium difficile* infection rate has been worse than the national average for the last two years.

The statewide Clostridium difficile infection rate has been worse than the national average for the last two years.

Table 5: Number of Surgical Site Infections and Standardized Infection Ratios in Hospitals and Ambulatory Surgery Centers (ASCs) – Colorado, August 2013-July 2016

Facility Type and Procedure	August 2013- July 2014				August 2014- July 2015				August 2015- July 2016			
	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Hospitals												
Breast Surgery	10,255	107	1.3	Worse	10,990	129	1.5	Worse	10,983	111	1.2	Same
Colon Surgery	4,779	197	0.7	Better	4,752	212	0.8	Better	5,067	240	0.8	Better
Coronary Artery Bypass Graft	1,620	16	0.5	Better	1,709	21	0.7	Same	1,663	19	0.6	Better
Hip Replacement	9,858	94	0.8	Better	10,615	123	1	Same	10,611	123	0.9	Same
Knee Replacement	14,746	91	0.6	Better	15,545	104	0.7	Better	15,819	100	0.7	Better
Abdominal Hysterectomy	6,863	73	0.6	Better	6,914	66	0.6	Better	7,147	77	0.6	Better
ASCs												
Breast Surgery	5,498	24	0.9	Same	5,619	19	0.7	Same	5,840	14	0.7	Same
Hernia	6,187	12	0.4	Better	5,621	9	0.3	Better	5,473	4	0.2	Better
Hip Replacement	278	0	0	Same	363	5	1.7	Same	379	2	0.6	Same
Knee Replacement	636	0	0	Same	710	0	0	Same	701	2	6.3	Same
Vaginal Hysterectomy	44	0	0	Same	48	0	0	Same	77	0	0	Same

SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for procedure risk factors.

Table 6: Number of Central Line-Associated Bloodstream Infections and Standardized Infection Ratios in Hospitals by Unit Type – Colorado, August 2013-July 2016

Facility/Unit Type	August 2013- July 2014				August 2014- July 2015				August 2015- July 2016			
	Central Line Days	No. of Infections	SIR	National Comparison	Central Line Days	No. of Infections	SIR	National Comparison	Central Line Days	No. of Infections	SIR	National Comparison
Adult Critical Care	110,824	99	0.9	Same	107,652	85	0.8	Same	103,816	100	1	Same
Neonatal Critical Care	19,384	17	0.8	Same	19,429	34	1.7	Worse	19,485	25	1.3	Same
Long-Term Acute Care Facility	32,826	14	0.5	Better	33,584	15	0.5	Better	32,386	33	1.1	Same
Inpatient Rehab Facility/Ward	10,527	2	0.7	Same	9,468	2	0.7	Same	9,101	2	0.7	Same

SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for procedure risk factors.

Table 7: Number of Dialysis Infections and Standardized Infection Ratios in Outpatient Dialysis Facilities by Infection Type – Colorado, August 2013-July 2016

Infection Type	August 2013- July 2014				August 2014- July 2015				August 2015- July 2016			
	Patient Months	No. of Infections	Rate	National Comparison	Patient Months	No. of Infections	Rate	National Comparison	Patient Months	No. of Infections	Rate	National Comparison
Access-Related Bloodstream	40,911	335	0.8	Worse	41,926	245	0.6	Same	42,922	217	0.5	Same
Local Vascular Access	40,911	532	1.3	NA	41,926	385	0.9	NA	42,922	311	0.7	NA

Note: An access-related bloodstream infection is the presence of a microorganism identified in a blood culture, and the source of infection is reported as the vascular access. A local vascular access infection is the presence of pus, redness or swelling of the vascular access site.

Table 8: Number of Hospital-Onset *Clostridium difficile* infections and Standardized Infection Ratios in Hospitals – Colorado, January 2014-July 2016

	August 2013 - July 2014				August 2014- July 2015				August 2015- July 2016			
	Patient Days	No. of Infections	SIR	National Comparison	Patient Days	No. of Infections	SIR	National Comparison	Patient Days	No. of Infections	SIR	National Comparison
Clostridium difficile infection	1,631,563	1,175	1.0	Same	1,628,657	1,328	1.1	Worse	1,574,615	1,340	1.1	Worse

SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for patient and facility risk factors

Colorado facility-specific healthcare-associated infection data

Surgical site infections

Overview

Surgical site infections (SSI) are infections directly related to a surgical procedure. It is estimated that more than 20 percent of HAI are attributed to SSI, equating to infections in approximately 2 percent of all surgical procedures nationally.[5] The impact from an SSI can be devastating, often leading to a longer hospital stay, additional treatment and higher costs.[6] The economic toll per patient occurrence is estimated to be between $3,000 and $25,500 depending on the procedure and pathogen(s) involved.[1,7] Overall in the United States, SSI can cost consumers and health care payers from 3 to 10 billion dollars each year.[1]

Surgical procedures required for SSI reporting are selected because they are (1) performed at a high volume, (2) performed at a variety of facilities, and (3) associated with a high risk for SSI. The surgeries monitored for SSI in Colorado include cardiac procedures, hip and knee replacements, hernia repairs, hysterectomies (abdominal and vaginal), and breast and colon procedures. The NHSN manual defines a reportable surgical procedure as an operation that takes place in an operating room, where at least one incision (including laparoscopic approach and cranial Burr holes) is made through the skin or mucous membrane, or reoperation via an incision that was left open during a prior operative procedure.[2] Surgeries are performed as either inpatient or outpatient procedures.

Reportable infections occur within 30 or 90 days of the procedure, depending on the type of procedure and infection depth. Common signs of infection include fever, pain or tenderness, drainage from the incision site, redness, or presence of an abscess. In NHSN, SSI are classified into three different categories based on the depth of the infection:

- Superficial incision infection, which involves only the top layers of the skin;
- Deep incision, which involves deeper soft tissues (e.g., fascia and muscle layers); and
- Organ space, which involves any part of the body that is opened or manipulated during the surgical procedure, excluding the top layers of skin, fascia or muscle layers.

Every table presenting SSI data below lists each facility in Colorado that performed the designated procedure, its city, the number of procedures performed, number of infections, standardized infection ratio (SIR) and a comparison to national infection data. For a detailed explanation of how the SIR is calculated, see Appendix B. There are three categories that indicate how a facility's own infection rate compares to the national infection rate. These are:

1. Statistically fewer infections than expected based on national infection rates (better);
2. Statistically similar infections as expected based on the national infection rates (same); or
3. Statistically more infections than expected based on national infection rates (worse).

Cardiac procedures

Background

A heart bypass, also known as a coronary artery bypass graft, is a surgery used to bypass blocked heart arteries by creating new passages for blood to flow to the heart muscle. Arteries or veins from other parts of the body are used as grafts to create alternative blood-flow pathways. There are two types of coronary artery bypass graft surgeries: one that has both chest and donor site incisions (CBGB) and one that uses a chest incision only (CBGC). Both types involve replacing damaged sections of one or more coronary arteries with undamaged arteries or veins such as the internal mammary artery (thoracic) and saphenous vein (leg) to increase cardiac blood flow. Most cardiac operative procedures performed in Colorado hospitals are CBGB. Based on the small number of CBGC surgeries performed, most SSI data associated with CBGC had to be suppressed to protect confidential health information and therefore, CBGC data are not presented in this report.

This year, Colorado's statewide SSI rate for coronary artery bypass surgeries was better than the national average.

Results

Table 9 shows facility-specific data for SSI attributed to CBGB surgeries performed in hospitals from Aug. 1, 2013 through July 31, 2016. The current year is Aug. 1, 2015 through July 31, 2016. Historical data for two previous reporting periods are also provided.

Fifteen hospitals reported a total of 1,663 CBGB surgeries this past year. Five hospitals reported zero SSI. One hospital had an individual facility SSI rate that was better than the national rate and all other hospitals had SSI rates similar to the national rate. In last year's reporting period, Colorado's statewide CBGB SSI rate was similar to the national rate; this year, it was better.

Table 9: Number of Surgical Site Infections and Standardized Infection Ratios for **Coronary Artery Bypass Grafts with Chest and Donor Site Incisions in Hospitals – Colorado, August 2013-July 2016**

Surgical Site Infections in Coronary Artery Bypass Grafts With Chest And Donor Site Incisions: Aug. 1, 2013 – July 31, 2016													
Health Facility and City		August 2013- July 2014				August 2014- July 2015				August 2015- July 2016			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Boulder Community Hospital	Boulder	56	0	0	Same	39	0	0	Same	80	0	0	Same
Centura Penrose St Francis Health	Colorado Springs	226	2	0.5	Same	211	2	0.6	Same	145	1	0.4	Same
Centura Porter Adventist Hospital	Denver	98	2	1.5	Same	90	2	1.5	Same	110	0	0	Same
Centura St Anthony Hospital	Lakewood	74	0	0	Same	74	0	0	Same	103	2	0.9	Same
MC of Aurora	Aurora	80	0	0	Same	130	0	0	Same	100	0	0	Same
MC of the Rockies	Loveland	249	4	0.7	Same	227	3	0.6	Same	227	0	0	Better
Memorial Hospital Central	Colorado Springs	151	2	0.9	Same	154	5	2.2	Same	139	2	0.9	Same
North Colorado MC	Greeley	64	0	0	Same	63	1	0.9	Same	56	0	0	Same
Parkview MC	Pueblo	15	***	***	***	65	1	0.9	Same	60	1	0.9	Same
Presbyterian St Luke's MC	Denver	11	***	***	***	0	***	***	***	0	***	***	***
Rose MC	Denver	15	***	***	***	25	1	2	Same	25	2	4.6	Same
SCLH Lutheran MC	Wheat Ridge	78	1	0.6	Same	70	0	0	Same	74	1	0.7	Same
SCLH St Joseph Hospital	Denver	213	0	0	Better	210	3	0.8	Same	231	1	0.2	Same
SCLH St Mary's Hospital	Grand Junction	110	1	0.6	Same	118	0	0	Same	126	5	2.5	Same
Sky Ridge MC	Lone Tree	23	0	0	Same	0	***	***	***	0	***	***	***
Swedish MC	Englewood	65	2	1.8	Same	87	0	0	Same	86	2	1.5	Same
University of Colorado Hospital	Aurora	92	2	0.8	Same	137	3	0.9	Same	101	2	0.9	Same

Note: SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for procedure risk factors; MC=medical center; SCLH=Sisters of Charity of Leavenworth Health System.
National comparison based on the indirect adjustment of modeled risk factors for each procedure type.
Infections for facilities performing less than 20 procedures per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements
*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of less than 1.
Source: National Health Care Safety Network (NHSN) Database

Orthopedic procedures

Background

A total or partial hip replacement is a surgery for people with severe hip damage or pain related to chronic osteoarthritis, rheumatoid arthritis, or other degenerative processes involving the hip joint. The surgical procedure for a hip replacement (HR) involves removing the damaged cartilage and bone from the hip joint and replacing them with an artificial device. The procedure consists of placing a cup, which is typically plastic, ceramic or metal, to replace the hip socket, a metal or ceramic ball to replace the head of the thighbone, and a metal stem to attach to the bone.

For hip surgeries, four hospitals reported SSI rates better than the national average, compared to none last year.

A total or partial knee replacement (KR) is a surgery for people with severe knee damage and pain related to osteoarthritis, rheumatoid arthritis or traumatic arthritis. A total knee replacement involves removing the damaged cartilage and bone from the surface of the knee joint and replacing them with an artificial device. In this procedure, the patella (kneecap) is removed, the femur (thigh bone) and tibia (shin bone) are cut down, and a metal, ceramic or plastic prosthesis is put in place.

Results

Tables 10 and 11 show facility specific data for SSI attributed to hip and knee surgeries performed in hospitals (inpatient and outpatient) and ASC (outpatient only) from Aug. 1, 2013 through July 31, 2016. The current year is Aug. 1, 2015 through July 31, 2016. Historical data for two previous reporting periods are also provided.

Sixty hospitals reported 10,611 HR surgeries this past year, 12 of which reported zero HR SSI. Four hospitals had an HR SSI rate better than the national average (compared to none last year) and one hospital's SSI rate was worse. Four ASC reported a total of 379 HR surgeries this past year with a total of two reported SSI.

Statewide, the SSI rate for knee surgeries in Colorado hospitals has been better than the national rate for four consecutive years.

Sixty-one hospitals reported 15,819 KR surgeries this past year; 20 reported zero KR SSI. Three hospitals had KR SSI rates better than the national average, and all others had rates similar to the national average. Statewide, the aggregate SSI rate for KR performed in Colorado hospitals has been better than the national rate for four consecutive years.

Ten ASC reported 701 KR surgeries and two SSI in the latest reporting period. In the previous three reporting periods, zero KR SSI had been reported by ASC.

Table 10: Number of Surgical Site Infections and Standardized Infection Ratios for Hip Replacements (Total or Partial) in Hospitals and Ambulatory Surgery Centers (ASC) – Colorado, August 2013-July 2016

Surgical Site Infections in Hip Replacement Procedures in Hospitals and Ambulatory Surgery Centers: Aug. 1, 2013 - July 31, 2016													
Health Facility and City		August 2013- July 2014				August 2014- July 2015				August 2015- July 2016			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Animas Surgical Hospital	Durango	118	0	0	Same	108	0	0	Same	106	0	0	Same
Arkansas Valley Regional MC	La Junta	16	***	***	***	10	***	***	***	13	***	***	***
Aspen Valley Hospital	Aspen	59	0	0	Same	47	0	0	Same	32	0	0	Same
Banner Fort Collins MC	Ft Collins	0	***	***	***	0	***	***	***	12	***	***	***
Boulder Community Hospital	Boulder	325	2	0.6	Same	61	0	0	Same	0	***	***	***
Boulder Community Hospital-Foothills	Boulder	0	***	***	***	319	3	1	Same	366	3	0.9	Same
Castle Rock Adventist Hospital	Castle Rock	73	0	0	Same	37	0	0	Same	29	0	0	Same
Centura Avista Adventist Hospital	Louisville	94	3	2.8	Same	107	3	2.4	Same	109	2	1.6	Same
Centura Littleton Adventist Hospital	Littleton	149	1	0.5	Same	180	1	0.4	Same	183	3	1.3	Same
Centura Penrose St Francis Health	Colorado Springs	494	2	0.3	Same	543	6	0.9	Same	545	1	0.2	Better
Centura Porter Adventist Hospital	Denver	713	12	1.5	Same	766	12	1.4	Same	841	3	0.3	Better
Centura St Anthony Hospital	Lakewood	174	1	0.3	Same	152	2	0.7	Same	112	1	0.5	Same
Centura St Anthony North Hospital	Westminster	82	0	0	Same	55	1	1.3	Same	54	2	3.1	Same
Centura St Francis MC	CO Springs	194	2	0.8	Same	314	3	0.8	Same	317	2	0.5	Same
Centura St Mary Corwin MC	Pueblo	148	2	1	Same	190	2	0.8	Same	204	2	0.7	Same
Centura St Thomas More Hospital	Canon City	29	3	8.1	Worse	23	3	8.3	Worse	31	1	1.9	Same
Cherry Creek Surgery Center	Englewood	Not yet operating				8	***	***	***	13	***	***	***
Children's Hospital Colorado	Aurora	29	1	1.3	Same	15	***	***	***	12	***	***	***
Colorado Plains MC	Fort Morgan	29	0	0	Same	27	0	0	Same	26	0	0	Same
Community Hospital	Grand Junction	77	1	0.8	Same	98	1	0.9	Same	79	2	2.1	Same
Delta County Memorial Hospital	Delta	52	0	0	Same	75	1	1	Same	28	0	0	Same
Denver Health MC	Denver	90	0	0	Same	142	7	2.5	Worse	129	5	2.1	Same
East Morgan County Hospital	Brush	8	***	***	***	0	***	***	***	0	***	***	***
Estes Park MC	Estes Park	10	***	***	***	16	***	***	***	11	***	***	***
Grand River MC	Rifle	14	***	***	***	13	***	***	***	10	***	***	***
Gunnison Valley Hospital	Gunnison	9	***	***	***	6	***	***	***	7	***	***	***
Heart of the Rockies Regional MC	Salida	41	0	0	Same	31	0	0	Same	32	0	0	Same

Surgical Site Infections in Hip Replacement Procedures in Hospitals and Ambulatory Surgery Centers: Aug. 1, 2013 - July 31, 2016													
Health Facility and City		August 2013- July 2014				August 2014- July 2015				August 2015- July 2016			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Lincoln Surgery Center	Parker	Not yet operating				1	***	***	***	2	***	***	***
Longmont United Hospital	Longmont	128	0	0	Same	158	1	0.5	Same	137	2	1.1	Same
McKee MC	Loveland	157	0	0	Same	160	1	0.6	Same	119	1	0.8	Same
MC of Aurora	Aurora	219	2	0.7	Same	204	2	0.8	Same	212	4	1.6	Same
MC of the Rockies	Loveland	131	4	2.1	Same	158	1	0.5	Same	163	2	0.9	Same
Memorial Hospital Central	Colorado Springs	225	4	1.2	Same	200	1	0.4	Same	127	1	0.5	Same
Memorial Hospital North	Colorado Springs	168	0	0	Same	140	3	1.9	Same	161	1	0.5	Same
Mercy Regional MC	Durango	92	0	0	Same	133	1	0.7	Same	109	3	2.4	Same
Montrose Memorial Hospital	Montrose	77	0	0	Same	70	0	0	Same	82	0	0	Same
North Colorado MC	Greeley	246	2	0.6	Same	223	3	0.9	Same	175	0	0	Same
North Suburban MC	Thornton	36	0	0	Same	53	0	0	Same	57	1	1.3	Same
OrthoColorado Hospital at St. Anthony Medical Campus	Lakewood	533	4	0.8	Same	564	3	0.6	Same	539	1	0.2	Same
Orthopaedic Center of the Rockies	Ft Collins	239	0	0	Same	308	4	1.6	Same	362	2	0.7	Same
Pagosa Springs MC	Pagosa Springs	6	***	***	***	12	***	***	***	10	***	***	***
Parker Adventist Hospital	Parker	155	1	0.5	Same	180	2	1.1	Same	230	7	2.4	Same
Parkview MC	Pueblo	183	0	0	Same	227	3	0.9	Same	222	0	0	Better
Pikes Peak Regional Hospital	Woodland Park	6	***	***	***	12	***	***	***	13	***	***	***
Pioneers Medical Center	Meeker	0	***	***	***	0	***	***	***	7	***	***	***
Poudre Valley Hospital	Ft Collins	511	6	0.9	Same	545	5	0.8	Same	678	5	0.7	Same
Presbyterian St Luke's MC	Denver	344	10	1.9	Same	222	7	1.9	Same	224	10	2.5	Worse
Rose MC	Denver	325	2	0.6	Same	339	1	0.3	Same	285	1	0.3	Same
San Luis Valley Regional MC	Alamosa	32	2	3.8	Same	23	0	0	Same	36	1	1.9	Same
SCLH Good Samaritan MC	Lafayette	422	4	0.8	Same	471	7	1.3	Same	509	8	1.3	Same
SCLH Lutheran MC	Wheat Ridge	169	2	0.8	Same	163	1	0.5	Same	159	3	1.3	Same
SCLH Platte Valley MC	Brighton	33	0	0	Same	56	1	1.3	Same	66	1	1.2	Same
SCLH St Joseph Hospital	Denver	838	4	0.4	Same	775	4	0.5	Same	742	6	0.7	Same
SCLH St Mary's Hospital	Grand Junction	292	0	0	Same	324	2	0.5	Same	330	0	0	Better
Sky Ridge MC	Lone Tree	764	6	0.7	Same	1,026	9	0.8	Same	938	11	1.1	Same
Southwest Memorial Hospital	Cortez	12	***	***	***	10	***	***	***	19	***	***	***
St Anthony Summit MC	Frisco	0	***	***	***	0	***	***	***	23	0	0	Same
Sterling Regional MC	Sterling	27	0	0	Same	35	0	0	Same	38	0	0	Same
Surgical Center at Premier	CO Springs	39	0	0	Same	46	1	3.2	Same	2	***	***	***

Surgical Site Infections in Hip Replacement Procedures in Hospitals and Ambulatory Surgery Centers: Aug. 1, 2013 – July 31, 2016													
Health Facility and City		August 2013- July 2014				August 2014- July 2015				August 2015- July 2016			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Swedish MC	Englewood	253	3	0.9	Same	292	4	1	Same	319	6	1.5	Same
The Memorial Hospital	Craig	4	***	***	***	2	***	***	***	17	***	***	***
University of Colorado Hospital	Aurora	317	4	0.6	Same	343	6	1.1	Same	374	8	1.3	Same
Vail Valley MC	Vail	1	***	***	***	5	***	***	***	16	***	***	***
Valley View Hospital	Glenwood Springs	69	0	0	Same	85	3	3.1	Same	107	3	2.7	Same
Wray Community Hospital	Wray	4	***	***	***	6	***	***	***	2	***	***	***
Yampa Valley MC	Steamboat Springs	52	0	0	Same	65	0	0	Same	78	1	1	Same

Note: SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for procedure risk factors; MC=medical center; SCLH=Sisters of Charity of Leavenworth Health System.
National comparison based on the indirect adjustment of modeled risk factors for each procedure type.
Infections for facilities performing less than 20 procedures per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.
*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of less than 1.
Source: National Health Care Safety Network (NHSN) Database.

Table 11: Number of Surgical Site Infections and Standardized Infection Ratios for Knee Replacements (Total or Partial) in Hospitals and Ambulatory Surgery Centers (ASC) – Colorado, August 2013-July 2016

Surgical Site Infections in Knee Replacement Procedures in Hospitals and ASCs: Aug. 1, 2013 – July 31, 2016													
Health Facility and City		August 2013- July 2014				August 2014- July 2015				August 2015- July 2016			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Animas Surgical Hospital	Durango	182	0	0	Same	149	1	0.7	Same	183	0	0	Same
Arkansas Valley Regional MC	La Junta	25	0	0	Same	21	0	0	Same	33	0	0	Same
Aspen Valley Hospital	Aspen	121	1	1.1	Same	106	1	1.3	Same	82	1	1.5	Same
Audubon ASC	CO Springs	0	***	***	***	0	***	***	***	2	***	***	***
Audubon ASC at St. Francis	CO Springs	0	***	***	***	0	***	***	***	16	***	***	***
Banner Fort Collins Medical Center	Ft Collins	0	***	***	***	0	***	***	***	24	0	0	Same
Boulder Community Hospital	Boulder	381	4	1.3	Same	75	0	0	Same	0	***	***	***
Boulder Community Hospital-Foothills	Boulder	0	***	***	***	360	2	0.8	Same	432	2	0.7	Same
Castle Rock Adventist Hospital	Castle Rock	106	0	0	Same	84	0	0	Same	59	0	0	Same
Centura Avista Adventist Hospital	Louisville	167	0	0	Same	182	1	0.7	Same	190	1	0.7	Same
Centura Littleton Adventist Hospital	Littleton	194	1	0.5	Same	231	1	0.4	Same	243	2	0.8	Same
Centura Penrose St Francis Health	Colorado Springs	455	1	0.2	Same	442	1	0.2	Same	419	2	0.5	Same
Centura Porter Adventist Hospital	Denver	1,143	5	0.5	Same	1,297	5	0.4	Same	1,296	5	0.5	Same
Centura St Anthony Hospital	Lakewood	137	3	1.6	Same	105	2	1.3	Same	76	2	1.8	Same
Centura St Anthony North Hospital	Westminster	73	1	1.7	Same	66	1	1.5	Same	46	0	0	Same
Centura St Francis MC	Colorado Springs	448	4	0.8	Same	651	5	0.8	Same	620	6	1	Same
Centura St Mary Corwin MC	Pueblo	238	1	0.5	Same	322	1	0.4	Same	405	3	0.9	Same
Centura St Thomas More Hospital	Canon City	61	0	0	Same	61	0	0	Same	86	2	2.7	Same
Cherry Creek Surgery Center	Englewood	42	0	0	Same	39	0	0	Same	65	1	5.3	Same
Children's Hospital Colorado	Aurora	2	***	***	***	2	***	***	***	11	***	***	***
Colorado Plains MC	Fort Morgan	44	0	0	Same	53	0	0	Same	62	0	0	Same
Community Hospital	Grand Junction	120	0	0	Same	144	0	0	Same	131	0	0	Same
Crown Point Surgery Center	Parker	0	***	***	***	0	***	***	***	21	0	***	***
Delta County Memorial Hospital	Delta	107	1	1.1	Same	100	0	0	Same	125	0	0	Same

Surgical Site Infections in Knee Replacement Procedures in Hospitals and ASCs: Aug. 1, 2013 – July 31, 2016													
Health Facility and City		August 2013- July 2014				August 2014- July 2015				August 2015- July 2016			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Denver Health MC	Denver	173	1	0.5	Same	159	1	0.6	Same	174	2	1.1	Same
East Morgan County Hospital	Brush	11	***	***	***	0	***	***	***	0	***	***	***
Estes Park MC	Estes Park	8	***	***	***	14	***	***	***	16	***	***	***
Grand River MC	Rifle	18	***	***	***	20	0	0	Same	14	***	***	***
Gunnison Valley Hospital	Gunnison	8	***	***	***	16	***	***	***	24	0	0	Same
Harmony Ambulatory Surgery Center	Ft Collins	0	***	***	***	15	***	***	***	3	***	***	***
Heart of the Rockies Regional MC	Salida	56	2	2.9	Same	46	0	0	Same	58	0	0	Same
Lincoln Surgery Center	Parker	0	***	***	***	19	***	***	***	49	0	***	***
Longmont United Hospital	Longmont	253	1	0.4	Same	291	1	0.4	Same	241	2	1	Same
Loveland Surgery Center	Loveland	1	***	***	***	1	***	***	***	0	***	***	***
McKee MC	Loveland	305	2	0.9	Same	184	2	1.4	Same	149	1	0.9	Same
MC of Aurora	Aurora	291	4	1.2	Same	274	5	1.6	Same	298	5	1.6	Same
MC of the Rockies	Loveland	178	3	1.6	Same	264	4	1.6	Same	321	4	1.4	Same
Memorial Hospital Central	Colorado Springs	215	3	1.3	Same	152	1	0.7	Same	102	1	1	Same
Memorial Hospital North	Colorado Springs	444	1	0.2	Same	406	2	0.6	Same	477	0	0	Better
Mercy Regional MC	Durango	149	0	0	Same	153	1	0.8	Same	180	0	0	Same
Montrose Memorial Hospital	Montrose	115	1	1	Same	168	0	0	Same	137	0	0	Same
North Colorado MC	Greeley	326	3	0.8	Same	374	4	1	Same	325	2	0.5	Same
North Suburban MC	Thornton	86	1	1.4	Same	75	1	1.4	Same	74	1	1.7	Same
Ortho Colorado Hospital at St. Anthony Medical Campus	Lakewood	1,117	3	0.4	Same	1,176	9	1	Same	1,295	6	0.6	Same
Orthopaedic Center of the Rockies	Ft Collins	446	0	***	***	491	0	***	***	493	0	***	***
Pagosa Springs MC	Pagosa Springs	7	***	***	***	14	***	***	***	30	0	0	Same
Parker Adventist Hospital	Parker	253	0	0	Same	273	3	1.3	Same	353	0	0	Same
Parkview MC	Pueblo	354	0	0	Better	367	4	0.9	Same	360	2	0.4	Same
Pikes Peak Regional Hospital	Woodland Park	26	0	0	Same	18	***	***	***	35	0	0	Same
Pioneers Medical Center	Meeker	0	***	***	***	0	***	***	***	17	***	***	***
Poudre Valley Hospital	Ft Collins	1,034	5	0.5	Same	985	8	0.9	Same	943	4	0.5	Same
Presbyterian St Luke's MC	Denver	370	5	0.9	Same	235	5	1.3	Same	267	5	1.1	Same
Rose MC	Denver	551	2	0.4	Same	594	4	0.8	Same	455	2	0.5	Same
Rose Surgical Center	Denver	18	***	***	***	26	0	0	Same	13	***	***	***

Surgical Site Infections in Knee Replacement Procedures in Hospitals and ASCs: Aug. 1, 2013 – July 31, 2016													
Health Facility and City		August 2013- July 2014				August 2014- July 2015				August 2015- July 2016			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
San Luis Valley Regional MC	Alamosa	31	0	0	Same	39	0	0	Same	44	1	2.3	Same
SCLH Good Samaritan MC	Lafayette	713	3	0.5	Same	713	3	0.5	Same	675	5	0.9	Same
SCLH Lutheran MC	Wheat Ridge	146	2	1.6	Same	143	1	0.8	Same	161	1	0.7	Same
SCLH Platte Valley MC	Brighton	71	0	0	Same	126	0	0	Same	147	2	1.5	Same
SCLH St Joseph Hospital	Denver	1,010	5	0.5	Same	950	8	0.9	Same	947	3	0.3	Better
SCLH St Mary's Hospital	Grand Junction	381	0	0	Better	421	1	0.3	Same	421	0	0	Better
Sky Ridge MC	Lone Tree	818	10	1.2	Same	1,149	5	0.4	Better	1,269	9	0.7	Same
Skyline Surgery Center	Loveland	9	***	***	***	1	***	***	***	0	***	***	***
Southwest Memorial Hospital	Cortez	28	0	0	Same	27	0	0	Same	32	0	0	Same
St Anthony Summit MC	Frisco	47	0	0	Same	60	0	0	Same	46	1	2.8	Same
Sterling Regional MC	Sterling	32	0	0	Same	29	0	0	Same	21	0	0	Same
Surgery Center At Lutheran	Wheat Ridge	28	0	***	***	21	0	***	***	28	0	***	***
Surgical Center at Premier	CO Springs	89	0	0	Same	66	0	0	Same	11	***	***	***
Swedish MC	Englewood	406	4	1	Same	414	2	0.5	Same	422	2	0.5	Same
The Memorial Hospital	Craig	8	***	***	***	9	***	***	***	12	***	***	***
University of Colorado Hospital	Aurora	338	6	1.3	Same	391	3	0.7	Same	358	7	1.7	Same
Vail Valley MC	Vail	139	1	1	Same	104	0	0	Same	63	0	0	Same
Valley View Hospital	Glenwood Springs	105	0	0	Same	120	2	1.9	Same	167	2	1.4	Same
Wray Community Hospital	Wray	9	***	***	***	12	***	***	***	10	***	***	***
Yampa Valley MC	Steamboat Springs	112	0	0	Same	129	2	2	Same	154	1	0.8	Same
Yuma District Hospital	Yuma	0	***	***	***	0	***	***	***	2	***	***	***

Note: SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for procedure risk factors; MC=medical center; SCLH=Sisters of Charity of Leavenworth Health System.
National comparison based on the indirect adjustment of modeled risk factors for each procedure type. Source: National Health Care Safety Network (NHSN) Database.
*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of less than 1.
Infections for facilities performing less than 20 procedures per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.

Abdominal procedures

Background

The surgeries presented in this section are hernia repairs, colon surgeries and hysterectomies (abdominal and vaginal). These surgeries can be performed as inpatient or outpatient procedures.

A hernia procedure involves the repair of a hernia or bulging of internal organs or tissues that protrude through an abnormal opening in the muscle wall. Reportable NHSN hernia procedures include inguinal, femoral, umbilical or anterior abdominal wall repairs.
In Colorado, hernia repairs were removed from mandatory reporting in acute care hospitals based on new national reporting requirements by the Centers for Medicare and Medicaid Services (CMS). To fulfill CMS reimbursement requirements, facilities nationwide began reporting certain colon procedures on Jan. 1, 2013. Since facilities already were reporting colon surgeries to fulfill CMS requirements, Colorado removed the mandatory reporting of hernia repairs in hospitals, replacing it with colon surgeries. Hernia repair remains a reportable surgery for ASC, and colon surgeries are reportable only by hospitals.

Colon surgeries involve the excision of abnormal tissue in the large intestines. The intestines, which are muscular tubes that extend from the end of the stomach to the rectum, carry food, products of digestion and bacteria that help break down food in the digestive process. Since the intestines house bacteria, colon surgeries have a high risk for contamination and infection.

Hysterectomies are reported both by hospitals and ASC and involve the surgical removal of the uterus and occasionally, one or both fallopian tubes and/or ovaries. Indications for hysterectomy typically include but are not limited to benign fibroid tumors, cancerous tumors, uterine prolapse (uterus slips down into the vagina), endometriosis (cells from the uterine lining grow outside the uterus, causing pain and bleeding), chronic pelvic pain, and others.

Number of procedures, number of infections and SIRs for hernia repairs, colon surgeries and hysterectomies are presented in Tables 12-15 below.

Hernia repairs

Hernia procedures involve the repair of bulging internal organs or tissues that protrude through an abnormal opening in the muscle wall. Reportable NHSN hernia procedures include inguinal, femoral, umbilical or anterior abdominal wall repairs. Since January 2014, hospitals no longer are required to report hernia repairs; therefore, hernia repairs are only reported for ambulatory surgery centers (ASC).

The statewide SSI rate for hernia repairs done in ASC remained better than the national average for the last several reporting years.

Results

Table 12 shows facility specific data for SSI attributed to hernia repairs performed in ASC from Aug. 1, 2013 through July 31, 2016, along with historical data for two previous reporting periods.

Thirty-three ASC reported 5,473 hernia repairs this past year; 18 ASC reported zero SSI. Individually, hernia repair SSI rates were similar to the national average for all ASC. However, when examining all ASC combined (see Table 5), the statewide hernia SSI rate has been better than the national average for the last several reporting periods.

Table 12: Number of Surgical Site Infections and Standardized Infection Ratios for Hernia Repairs in Ambulatory Surgery Centers - Colorado, August 2013 – July 2016

Surgical Site Infections in Hernia Repairs in Ambulatory Surgery Centers (ASC): Aug. 1, 2013 – July 31, 2016													
Health Facility and City		August 2013- July 2014				August 2014- July 2015				August 2015- July 2016			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
ASC Durango at Mercy MC	Durango	90	0	0	Same	68	0	0	Same	58	0	0	Same
Aberdeen Ambulatory Surgical Center	Pueblo	1	***	***	***	1	***	***	***	3	***	***	***
Arkansas Valley Surgery Center	Canon City	90	0	0	Same	112	0	0	Same	100	0	0	Same
Audubon Ambulatory Surgery Center	Colorado Springs	38	0	0	Same	16	***	***	***	1	***	***	***
Audubon Ambulatory Surgery Center at St. Francis	Colorado Springs	552	1	0.4	Same	580	0	0	Same	450	1	0.5	Same
Black Canyon Surgical Center	Montrose	33	0	0	Same	41	0	0	Same	46	0	0	Same
Centrum Surgical Center	Greenwood Village	20	0	0	Same	3	***	***	***	5	***	***	***
Children's North Surgery Center	Broomfield	72	0	0	Same	56	0	0	Same	71	0	0	Same
Clear Creek Surgery Center	Wheat Ridge	311	0	0	Same	308	0	0	Same	314	1	0.7	Same
Crown Point Surgery Center	Parker	307	0	0	Same	318	0	0	Same	312	0	0	Same
Denver Midtown Surgery Center	Denver	215	0	0	Same	212	0	0	Same	184	0	0	Same
First Choice Outpatient Surgery Center at Community Hospital	Grand Junction	55	0	0	Same	0	***	***	***	0	***	***	***
Grand Valley Surgical Center	Grand Junction	199	5	5.2	Worse	199	0	0	Same	193	0	0	Same
Harmony Ambulatory Surgery Center	Ft Collins	498	2	0.8	Same	445	1	0.5	Same	491	0	0	Same
Harvard Park Surgery Center	Denver	0	***	***	***	7	***	***	***	36	0	0	Same
Kaiser Lone Tree Surgery Center	Lone Tree	60	1	3.5	Same	248	2	1.6	Same	362	1	0.5	Same
Kaiser Permanente Ambulatory Surgery Center	Denver	708	1	0.3	Same	452	2	0.8	Same	440	0	0	Same
Lincoln Surgery Center	Parker	19	***	***	***	0	***	***	***	0	***	***	***
Longmont Surgery Center	Longmont	104	1	2.1	Same	84	0	0	Same	91	0	0	Same
Midvalley ASC	Basalt	8	***	***	***	5	***	***	***	0	***	***	***

Surgical Site Infections in Hernia Repairs in Ambulatory Surgery Centers (ASC): Aug. 1, 2013 – July 31, 2016													
Health Facility and City		August 2013- July 2014				August 2014- July 2015				August 2015- July 2016			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
North Suburban Surgery Center	Thornton	181	0	0	Same	56	1	3.6	Same	0	***	***	***
Parkwest Surgery Center	Pueblo	9	***	***	***	4	***	***	***	16	***	***	***
Peak One Surgery Center	Frisco	56	0	0	Same	62	0	0	Same	76	0	0	Same
Pueblo Surgery Center	Pueblo	1	***	***	***	5	***	***	***	5	***	***	***
Red Rocks Surgery Center	Golden	327	0	0	Same	302	0	0	Same	274	0	0	Same
Renewal Surgery Center	Lone Tree	6	***	***	***	6	***	***	***	5	***	***	***
Rocky Mountain Surgery Center	Englewood	354	0	0	Same	325	2	1.3	Same	355	0	0	Same
Rose Surgical Center	Denver	456	0	0	Same	387	1	0.6	Same	326	0	0	Same
Sky Ridge Surgical Center	Lone Tree	506	0	0	Same	332	0	0	Same	220	0	0	Same
Skyline Surgery Center	Loveland	160	0	0	Same	172	0	0	Same	175	0	0	Same
Southwest Colorado Surgical Center	Cortez	15	***	***	***	14	***	***	***	7	***	***	***
Summit View Surgery Center	Littleton	323	1	0.7	Same	407	0	0	Same	414	0	0	Same
Surgery Center At Lutheran	Wheat Ridge	1	***	***	***	0	***	***	***	15	***	***	***
Surgery Center Of Ft Collins	Ft Collins	10	***	***	***	10	***	***	***	2	***	***	***
Surgery Center of the Rockies	Colorado Springs	68	0	0	Same	28	0	0	Same	7	***	***	***
Surgical Center at Premier	Colorado Springs	74	0	0	Same	82	0	0	Same	6	***	***	***
UCH Memorial Surgery Center At Printers Park	Colorado Springs	237	0	0	Same	225	0	0	Same	222	1	1	Same

Note: SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for procedure risk factors.
National comparison based on the indirect adjustment of modeled risk factors for each procedure type.
*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of less than 1.
Infections for facilities performing less than 20 procedures per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.
Source: National Health Care Safety Network (NHSN) Database.

Colon surgeries

Colon surgeries involve the large intestines, muscular tubes that extend from the end of the stomach to the rectum. The intestines carry bacteria as part of the digestive process, and therefore have a high risk for contamination and infection. Facilities began reporting colon procedures on Jan. 1, 2013, as part of the Centers for Medicare and Medicaid Services (CMS) reporting requirements.

The statewide aggregate rate for colon SSI remained better than the national average since reporting of these surgeries began.

Results

Table 13 shows facility specific data for SSI attributed to colon surgeries performed from Aug.1, 2013 through July 31, 2016.

Fifty-seven hospitals reported 5,067 colon surgeries this past year and three hospitals reported zero SSI. Three hospitals had colon SSI rates better than the national average, and one had a rate that was worse; all others had rates similar to the national average. When combining data across all Colorado hospitals (Table 5), the statewide aggregate rate for colon SSI has remained better than the national average since reporting of these surgeries began on Jan. 1, 2012.

Table 13: Number of Surgical Site Infections and Standardized Infection Ratios for Colon Surgeries in Hospitals - Colorado, August 2013 – July 2016

Surgical Site Infections in Colon Procedures in Hospitals: Aug. 1, 2013 – July 31, 2016													
Health Facility and City		August 2013-July 2014				August 2014-July 2015				August 2015-July 2016			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Arkansas Valley Regional MC	La Junta	12	***	***	***	6	***	***	***	6	***	***	***
Aspen Valley Hospital	Aspen	6	***	***	***	6	***	***	***	18	***	***	***
Banner Fort Collins Medical Center	Ft Collins	0	***	***	***	0	***	***	***	5	***	***	***
Boulder Community Hospital	Boulder	102	4	0.7	Same	15	***	***	***	0	***	***	***
Boulder Community Hospital-Foothills	Boulder	2	***	***	***	81	7	1.5	Same	92	7	1.4	Same
Castle Rock Adventist Hospital	Castle Rock	23	2	1.5	Same	23	0	0	Same	32	1	0.6	Same
Centura Avista Adventist Hospital	Louisville	32	1	0.5	Same	39	3	1.5	Same	31	4	2.3	Same
Centura Littleton Adventist Hospital	Littleton	83	4	0.8	Same	64	3	0.8	Same	81	4	0.8	Same
Centura Penrose St Francis Health	CO Springs	206	18	1.6	Same	226	22	1.7	Worse	189	15	1.4	Same
Centura Porter Adventist Hospital	Denver	67	3	0.8	Same	75	1	0.2	Same	61	0	0	Same
Centura St Anthony Central Hospital	Denver	115	5	0.7	Same	113	5	0.7	Same	141	7	0.8	Same
Centura St Anthony North Hospital	Westminster	86	3	0.6	Same	68	4	1	Same	86	6	1.3	Same
Centura St Francis MC	CO Springs	90	2	0.4	Same	80	3	0.7	Same	95	2	0.4	Same
Centura St Mary Corwin MC	Pueblo	51	3	0.9	Same	67	1	0.2	Same	28	3	1.7	Same
Centura St Thomas More Hospital	Canon City	47	4	1.6	Same	35	2	1	Same	38	3	1.4	Same
Children's Hospital Colorado	Aurora	106	3	0.5	Same	85	1	0.2	Same	83	2	0.4	Same
Colorado Plains MC	Fort Morgan	15	***	***	***	7	***	***	***	6	***	***	***
Community Hospital	Grand Junction	52	2	0.7	Same	75	3	0.7	Same	59	3	0.9	Same
Delta County Memorial Hospital	Delta	35	2	1.1	Same	21	0	0	Same	50	1	0.3	Same
Denver Health MC	Denver	94	12	1.8	Same	87	13	2.2	Worse	83	2	0.3	Same
East Morgan County Hospital	Brush	5	***	***	***	2	***	***	***	0	***	***	***

Surgical Site Infections in Colon Procedures in Hospitals: Aug. 1, 2013 – July 31, 2016													
Health Facility and City		August 2013-July 2014				August 2014-July 2015				August 2015-July 2016			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Estes Park Medical Center	Estes Park	0	***	***	***	0	***	***	***	2	***	***	***
Grand River MC	Rifle	0	***	***	***	8	***	***	***	3	***	***	***
Gunnison Valley Hospital	Gunnison	1	***	***	***	1	***	***	***	2	***	***	***
Heart of the Rockies Regional MC	Salida	14	***	***	***	11	***	***	***	20	0	0	Same
Longmont United Hospital	Longmont	99	5	0.9	Same	102	2	0.3	Same	81	3	0.7	Same
McKee MC	Loveland	81	5	1.2	Same	80	7	1.5	Same	43	1	0.4	Same
MC of Aurora	Aurora	108	3	0.6	Same	123	7	1.2	Same	137	5	0.8	Same
MC of the Rockies	Loveland	145	9	1	Same	118	4	0.6	Same	152	5	0.5	Same
Memorial Hospital Central	CO Springs	211	9	0.7	Same	230	9	0.7	Same	252	5	0.3	Better
Memorial Hospital North	CO Springs	55	4	1.5	Same	62	3	1	Same	81	0	0	Better
Mercy Regional MC	Durango	40	0	0	Same	58	1	0.3	Same	47	2	0.9	Same
Montrose Memorial Hospital	Montrose	29	0	0	Same	41	4	1.8	Same	38	2	1	Same
Mt San Rafael Hospital	Trinidad	2	***	***	***	6	***	***	***	2	***	***	***
North Colorado MC	Greeley	163	9	0.9	Same	172	13	1.3	Same	134	13	1.6	Same
North Suburban MC	Thornton	73	1	0.2	Same	38	3	1.4	Same	59	2	0.6	Same
Pagosa Springs MC	Pagosa Springs	1	***	***	***	4	***	***	***	2	***	***	***
Parker Adventist Hospital	Parker	121	2	0.3	Same	112	3	0.5	Same	130	4	0.6	Same
Parkview MC	Pueblo	116	4	0.7	Same	155	12	1.5	Same	197	20	1.9	Worse
Pikes Peak Regional Hospital	Woodland Park	0	***	***	***	3	***	***	***	0	***	***	***
Pioneers Medical Center	Meeker	0	***	***	***	0	***	***	***	2	***	***	***
Poudre Valley Hospital	Ft Collins	161	8	1	Same	174	3	0.3	Better	165	4	0.4	Same
Presbyterian St Luke's MC	Denver	107	1	0.2	Better	127	4	0.6	Same	135	4	0.5	Same
Prowers MC	Lamar	4	***	***	***	8	***	***	***	6	***	***	***
Rose MC	Denver	228	2	0.2	Better	219	10	1	Same	187	13	1.5	Same
San Luis Valley Regional MC	Alamosa	12	***	***	***	16	***	***	***	13	***	***	***
SCLH Good Samaritan MC	Lafayette	165	9	0.9	Same	177	5	0.5	Same	198	10	0.8	Same
SCLH Lutheran MC	Wheat Ridge	172	9	0.8	Same	170	8	0.7	Same	185	12	1	Same
SCLH Platte Valley MC	Brighton	23	3	2.5	Same	28	0	0	Same	52	6	2.3	Same
SCLH St Joseph Hospital	Denver	337	11	0.6	Same	217	12	0.9	Same	265	13	0.8	Same
SCLH St Mary's Hospital	Grand Junction	199	3	0.3	Better	179	3	0.3	Better	176	4	0.4	Same

Surgical Site Infections in Colon Procedures in Hospitals: Aug. 1, 2013 – July 31, 2016													
Health Facility and City		August 2013-July 2014				August 2014-July 2015				August 2015-July 2016			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Sky Ridge MC	Lone Tree	159	5	0.6	Same	200	3	0.3	Better	272	8	0.5	Same
Southwest Memorial Hospital	Cortez	18	***	***	***	15	***	***	***	18	***	***	***
St Anthony Summit MC	Frisco	8	***	***	***	6	***	***	***	6	***	***	***
Sterling Regional MC	Sterling	10	***	***	***	20	1	0.8	Same	7	***	***	***
Swedish MC	Englewood	328	13	0.7	Same	317	15	0.9	Same	328	17	1	Same
University of Colorado Hospital	Aurora	292	4	0.2	Better	327	6	0.2	Better	421	22	0.6	Better
Vail Valley MC	Vail	9	***	***	***	11	***	***	***	8	***	***	***
Valley View Hospital	Glenwood Springs	46	3	1.1	Same	24	0	0	Same	43	4	1.7	Same
Yampa Valley MC	Steamboat Springs	8	***	***	***	17	***	***	***	17	***	***	***
Yuma District Hospital	Yuma	1	***	***	***	1	***	***	***	0	***	***	***

Note: SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for procedure risk factors; MC=medical center; SCLH=Sisters of Charity of Leavenworth Health System.
National comparison based on the indirect adjustment of modeled risk factors for each procedure type.
Infections for facilities performing less than 20 procedures per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.
*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of less than 1.
Source: National Health Care Safety Network (NHSN) Database.

Hysterectomies

Hysterectomies have traditionally been performed by making a large abdominal incision to access the uterus and surrounding anatomy. This traditional, open abdominal surgery often causes significant pain, threat to surrounding organs and nerves, long recovery periods and a higher risk of bleeding and infection.[8] Based on these negative outcomes, surgeons began using less invasive techniques such as vaginal hysterectomies. In traditional vaginal hysterectomies, the procedure is completed through the vagina with no abdominal incisions.

Compared to traditional, open abdominal hysterectomies, vaginal hysterectomies have been shown to result in fewer surgical complications and infections.[9] This report presents SSI for both abdominal and vaginal hysterectomies.

The statewide SSI rate for abdominal hysterectomies has been better than the national average for over four years.

Results

Tables 14 and 15 show facility specific data for SSI attributed to abdominal and vaginal hysterectomies performed from Aug. 1, 2013 through July 31, 2016.

Fifty-eight hospitals reported 7,147 abdominal hysterectomies (AHYS) in this reporting period. Of those facilities, 12 reported zero infections. Three facilities had SSI rates better than the national average and one had a rate that was worse; all others had SSI rates similar to the national average. However, when numbers for all facilities are combined (Table 5), the state's SSI rate for abdominal hysterectomies has been better than the national average over four reporting periods.

Since reporting of vaginal hysterectomies by ambulatory surgery centers began in 2011, zero SSI have been reported.

Beginning July 2014, hospitals were no longer required to report vaginal hysterectomies (VHYS). Fewer ASC have reported performing VHYS over the last few years. This year, only three ASC reported performing 77 VHYS and 75 of those were performed at one ASC. Since ASC began reporting SSI in vaginal hysterectomies in 2011, the statewide VHYS SSI rate has been similar to the national average and zero SSI have been reported.

Table 14: Number of Surgical Site Infections and Standardized Infection Ratios for Abdominal Hysterectomies in Hospitals – Colorado, August 2013 – July 2016

Surgical Site Infections in Abdominal Hysterectomies in Hospitals : Aug. 1, 2013 – July 31, 2016													
Health Facility and City		August 2013- July 2014				August 2014- July 2015				August 2015- July 2016			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Animas Surgical Hospital	Durango	8	***	***	***	7	***	***	***	6	***	***	***
Arkansas Valley Regional MC	La Junta	7	***	***	***	15	***	***	***	4	***	***	***
Aspen Valley Hospital	Aspen	10	***	***	***	9	***	***	***	6	***	***	***
Banner Fort Collins MC	Ft Collins	0	***	***	***	0	***	***	***	25	0	0	Same
Boulder Community Hospital	Boulder	31	0	0	Same	13	***	***	***	0	***	***	***
Boulder Community Hospital-Foothills	Boulder	4	***	***	***	63	1	0.9	Same	72	1	0.9	Same
Castle Rock Adventist Hospital	Castle Rock	15	***	***	***	33	0	0	Same	32	0	0	Same
Centura Avista Adventist Hospital	Louisville	84	0	0	Same	107	2	1	Same	150	3	1.1	Same
Centura Littleton Adventist Hospital	Littleton	109	0	0	Same	189	0	0	Same	290	3	0.6	Same
Centura Penrose St Francis Health	CO Springs	329	6	1	Same	304	4	0.7	Same	294	1	0.2	Same
Centura Porter Adventist Hospital	Denver	104	0	0	Same	107	1	0.4	Same	116	0	0	Same
Centura St Anthony Central Hospital	Denver	26	1	2.3	Same	29	0	0	Same	24	0	0	Same
Centura St Anthony North Hospital	Westminster	12	***	***	***	60	0	0	Same	64	5	4.1	Worse
Centura St Francis MC	CO Springs	357	6	1.1	Same	362	2	0.4	Same	376	4	0.8	Same
Centura St Mary Corwin MC	Pueblo	139	2	0.8	Same	91	0	0	Same	88	1	0.7	Same
Centura St Thomas More Hospital	Canon City	33	0	0	Same	38	2	2.6	Same	38	1	1.3	Same
Colorado Plains MC	Fort Morgan	19	***	***	***	22	0	0	Same	17	***	***	***
Community Hospital	Grand Junction	26	1	2.2	Same	61	1	0.9	Same	82	2	1.3	Same
Delta County Memorial Hospital	Delta	51	1	1	Same	41	0	0	Same	12	***	***	***
Denver Health MC	Denver	77	4	2.2	Same	76	2	1	Same	83	2	0.9	Same
East Morgan County Hospital	Brush	0	***	***	***	0	***	***	***	12	***	***	***
Estes Park MC	Estes Park	1	***	***	***	0	***	***	***	2	***	***	***
Grand River MC	Rifle	7	***	***	***	0	***	***	***	2	***	***	***

Surgical Site Infections in Abdominal Hysterectomies in Hospitals : Aug. 1, 2013 - July 31, 2016													
Health Facility and City		August 2013- July 2014				August 2014- July 2015				August 2015- July 2016			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Gunnison Valley Hospital	Gunnison	14	***	***	***	6	***	***	***	6	***	***	***
Heart of the Rockies Regional MC	Salida	0	***	***	***	2	***	***	***	8	***	***	***
Longmont United Hospital	Longmont	204	4	1.4	Same	202	1	0.3	Same	217	1	0.3	Same
McKee MC	Loveland	187	1	0.3	Same	249	4	1	Same	259	4	1	Same
MC of Aurora	Aurora	93	0	0	Same	65	1	1	Same	77	2	1.5	Same
MC of the Rockies	Loveland	79	1	0.7	Same	49	0	0	Same	102	0	0	Same
Memorial Hospital Central	CO Springs	224	2	0.6	Same	207	0	0	Same	197	3	1	Same
Memorial Hospital North	CO Springs	107	1	0.7	Same	113	1	0.6	Same	86	0	0	Same
Mercy Regional MC	Durango	75	0	0	Same	72	0	0	Same	70	1	1	Same
Montrose Memorial Hospital	Montrose	100	2	1.4	Same	84	2	2.2	Same	88	1	0.9	Same
Mt San Rafael Hospital	Trinidad	6	***	***	***	4	***	***	***	4	***	***	***
North Colorado MC	Greeley	192	2	0.7	Same	198	2	0.6	Same	193	6	2	Same
North Suburban MC	Thornton	184	0	0	Same	186	0	0	Same	142	1	0.5	Same
Pagosa Springs MC	Pagosa Springs	2	***	***	***	2	***	***	***	0	***	***	***
Parker Adventist Hospital	Parker	145	1	0.4	Same	196	1	0.3	Same	242	2	0.4	Same
Parkview MC	Pueblo	145	0	0	Same	152	1	0.4	Same	257	0	0	Better
Pikes Peak Regional Hospital	Woodland Park	0	***	***	***	0	***	***	***	1	***	***	***
Pioneers MC	Meeker	1	***	***	***	0	***	***	***	0	***	***	***
Poudre Valley Hospital	Ft Collins	276	2	0.5	Same	297	3	0.6	Same	335	3	0.5	Same
Presbyterian St Luke's MC	Denver	84	0	0	Same	114	2	1	Same	107	0	0	Same
Prowers MC	Lamar	15	***	***	***	10	***	***	***	3	***	***	***
Rose MC	Denver	497	5	0.7	Same	400	2	0.3	Same	335	6	1.1	Same
San Luis Valley Regional MC	Alamosa	19	***	***	***	16	***	***	***	21	0	0	Same
SCLH Good Samaritan MC	Lafayette	219	4	1.2	Same	255	1	0.2	Same	259	2	0.4	Same
SCLH Lutheran MC	Wheat Ridge	342	2	0.4	Same	316	6	1.2	Same	314	2	0.3	Same
SCLH Platte Valley MC	Brighton	33	2	3.4	Same	50	4	6.6	Worse	63	2	2.5	Same
SCLH St Joseph Hospital	Denver	480	4	0.4	Better	433	10	0.9	Same	523	2	0.1	Better
SCLH St Mary's Hospital	Grand Junction	207	3	0.8	Same	180	0	0	Same	161	0	0	Same
Sky Ridge MC	Lone Tree	454	3	0.4	Same	421	1	0.2	Better	385	1	0.2	Better

Surgical Site Infections in Abdominal Hysterectomies in Hospitals : Aug. 1, 2013 - July 31, 2016													
Health Facility and City		August 2013- July 2014				August 2014- July 2015				August 2015- July 2016			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Southwest Memorial Hospital	Cortez	24	1	2.3	Same	20	0	0	Same	9	***	***	***
St Anthony Summit MC	Frisco	13	***	***	***	14	***	***	***	30	0	0	Same
Sterling Regional MC	Sterling	3	***	***	***	7	***	***	***	6	***	***	***
Swedish MC	Englewood	582	6	0.7	Same	524	2	0.2	Better	379	2	0.3	Same
The Memorial Hospital	Craig	3	***	***	***	2	***	***	***	3	***	***	***
University of Colorado Hospital	Aurora	316	4	0.5	Same	331	5	0.7	Same	339	10	1.2	Same
Vail Valley MC	Vail	25	0	0	Same	13	***	***	***	13	***	***	***
Valley View Hospital	Glenwood Springs	35	1	1.3	Same	44	1	1.7	Same	43	1	1.5	Same
Yampa Valley MC	Steamboat Springs	27	0	0	Same	51	0	0	Same	75	0	0	Same
Yuma District Hospital	Yuma	2	***	***	***	2	***	***	***	0	***	***	***

Note: SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for procedure risk factors; MC=medical center; SCLH=Sisters of Charity of Leavenworth Health System.
National comparison based on the indirect adjustment of modeled risk factors for each procedure type.
*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of less than 1.
Infections for facilities performing less than 20 procedures per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.
Source: National Health Care Safety Network (NHSN) Database.

Table 15: Number of Surgical Site Infections and Standardized Infection Ratios for Vaginal Hysterectomies in Ambulatory Surgery Centers - Colorado, August 2013 – July 2016

Surgical Site Infections in Vaginal Hysterectomies in Ambulatory Surgery Centers (ASC; In- and Outpatient Combined): Aug. 1, 2013 – July 31, 2016													
Health Facility and City		August 2013- July 2014				August 2014- July 2015				August 2015- July 2016			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Crown Point Surgery	Parker	8	***	***	***	2	***	***	***	0	***	***	***
Harvard Park Surgery	Denver	0	***	***	***	6	***	***	***	1	***	***	***
Peak One Surgery Center ASC	Frisco	2	***	***	***	0	***	***	***	0	***	***	***
Summit View Surgery Center	Littleton	0	***	***	***	0	***	***	***	1	***	***	***
Surgery Center At Lutheran	Wheat Ridge	2	***	***	***	0	***	***	***	0	***	***	***
Surgery Center Of Ft Collins	Ft Collins	28	0	0	Same	38	0	0	Same	75	0	0	Same
UCH Memorial Outpatient Surgery Center At Printers Park	CO Springs	4	***	***	***	2	***	***	***	0	***	***	***

Note: SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for procedure risk factors.
National comparison based on the indirect adjustment of modeled risk factors for each procedure type.
*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of less than 1.
Infections for facilities performing less than 20 procedures per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.
Source: National Health Care Safety Network (NHSN) Database.

Breast procedures

Background

Breast procedures for purposes of surveillance and reporting into NHSN involve those procedures with at least one incision to the skin in either male or female patients performed in either inpatient or outpatient surgery locations. There are 36 types breast procedures that qualify in this category and can include an open biopsy of the breast, local excision of a lesion of the breast, insertion and removal of breast implants and radical mastectomies to name a few.

The statewide infection rate for breast surgeries performed in hospitals was similar to the national average, an improvement from the previous three years, when breast SSI rates were worse.

Results

Tables 16 and 17 show facility-specific data for SSI attributed to **breast procedures** in hospitals and ASC, respectively, performed from Aug.1, 2013 through July 31, 2016.

In the most recent reporting period, 59 hospitals reported 10,983 breast surgeries; 15 hospitals reported zero infections. Five hospitals had breast SSI rates worse than the national average and all other hospitals had SSI rates similar to the national average. When numbers from all hospitals were combined (Table 5), the statewide breast SSI rate was similar to the national average, an improvement from the previous three reporting periods, when statewide breast SSI rates were worse.

All ambulatory surgery centers had breast SSI rates similar to the national average.

Thirty-five ASC reported 5,840 breast surgeries and twenty ASC reported zero SSI. All ASC had breast SSI rates similar to the national average.

Table 16: Number of Surgical Site Infections and Standardized Infection Ratios for Breast Surgeries in Hospitals – Colorado, August 1, 2013 – July 31, 2016

Surgical Site Infections in Breast Procedures in Hospitals (In- and Outpatient Combined): Aug. 1, 2013 – July 31, 2016													
Health Facility and City		August 2013 – July 2014				August 2014 – July 2015				August 2015 – July 2016			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Animas Surgical Hospital	Durango	158	0	0	Same	196	0	0	Same	234	0	0	Same
Arkansas Valley Regional MC	La Junta	4	***	***	***	6	***	***	***	1	***	***	***
Aspen Valley Hospital	Aspen	10	***	***	***	15	***	***	***	25	0	0	Same
Banner Fort Collins Medical Center	Ft Collins	0	***	***	***	0	***	***	***	22	0	0	Same
Boulder Community Hospital	Boulder	248	5	1.8	Same	39	0	0	Same	0	***	***	***
Boulder Community Hospital-Foothills	Boulder	11	***	***	***	190	2	1.0	Same	182	2	1.0	Same
Castle Rock Adventist Hospital	Castle Rock	56	0	0	Same	138	1	0.6	Same	213	1	0.5	Same
Centura Avista Adventist Hospital	Louisville	227	1	0.5	Same	240	1	0.5	Same	566	2	0.4	Same
Centura Littleton Adventist Hospital	Littleton	301	1	0.6	Same	327	3	1.8	Same	364	1	0.5	Same
Centura Penrose St Francis Health	CO Springs	380	0	0	Same	384	4	2.4	Same	397	2	1.1	Same
Centura Porter Adventist Hospital	Denver	124	2	2.5	Same	151	2	2.4	Same	102	1	1.9	Same
Centura St Anthony Central Hospital	Denver	341	0	0	Same	284	5	3.4	Worse	228	1	0.9	Same
Centura St Anthony North Hospital	Westminster	41	1	1.4	Same	50	0	0	Same	56	0	0	Same
Centura St Francis MC	CO Springs	147	0	0	Same	199	0	0	Same	154	0	0	Same
Centura St Mary Corwin MC	Pueblo	172	1	0.6	Same	127	3	2.1	Same	108	2	1.7	Same
Centura St Thomas More Hospital	Canon City	21	0	0	Same	13	***	***	***	18	***	***	***
Childrens Hospital Colorado	Aurora	16	***	***	***	21	1	9.8	Same	14	***	***	***
Colorado Plains MC	Fort Morgan	14	***	***	***	15	***	***	***	10	***	***	***
Community Hospital	Grand Junction	79	1	1.2	Same	172	1	0.6	Same	239	2	0.7	Same
Delta County Memorial Hospital	Delta	50	0	0	Same	52	0	0	Same	40	0	0	Same
Denver Health MC	Denver	144	3	1.1	Same	143	1	0.4	Same	217	4	0.9	Same
East Morgan County Hospital	Brush	13	***	***	***	2	***	***	***	17	***	***	***

Surgical Site Infections in Breast Procedures in Hospitals (In- and Outpatient Combined): Aug. 1, 2013 - July 31, 2016													
Health Facility and City		August 2013 - July 2014				August 2014 - July 2015				August 2015 - July 2016			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Estes Park MC	Estes Park	2	***	***	***	7	***	***	***	3	***	***	***
Family Health West Hospital	Grand Junction	25	0	0	Same	2	***	***	***	0	***	***	***
Grand River MC	Rifle	41	0	***	***	55	0	***	***	32	0	***	***
Gunnison Valley Hospital	Gunnison	0	***	***	***	0	***	***	***	3	***	***	***
Heart of the Rockies Regional MC	Salida	32	0	0	Same	24	0	0	Same	30	0	0	Same
Kit Carson Memorial Hospital	Burlington	1	***	***	***	1	***	***	***	0	***	***	***
Longmont United Hospital	Longmont	70	1	1.6	Same	57	2	3.7	Same	109	1	0.8	Same
McKee MC	Loveland	139	0	0	Same	137	1	0.7	Same	115	0	0	Same
MC of Aurora	Aurora	252	3	2.8	Same	222	0	0	Same	201	0	0	Same
MC of the Rockies	Loveland	242	2	0.6	Same	201	1	0.4	Same	228	1	0	Same
Memorial Hospital Central	CO Springs	39	2	8.9	Worse	51	1	4.0	Same	42	1	5.1	Same
Memorial Hospital North	CO Springs	255	2	0.7	Same	336	5	1.3	Same	335	5	1.3	Same
Mercy Regional MC	Durango	117	0	0	Same	157	3	1.7	Same	127	0	0	Same
Montrose Memorial Hospital	Montrose	83	2	2.3	Same	54	2	3.9	Same	42	3	6.7	Worse
Mt San Rafael Hospital	Trinidad	0	***	***	***	1	***	***	***	0	***	***	***
North Colorado MC	Greeley	179	3	3.6	Same	178	1	1.3	Same	211	3	3.3	Same
North Suburban MC	Thornton	58	0	0	Same	65	0	0	Same	64	0	0	Same
Pagosa Springs MC	Pagosa Springs	3	***	***	***	3	***	***	***	4	***	***	***
Parker Adventist Hospital	Parker	75	4	3.8	Worse	88	1	0.8	Same	102	0	0	Same
Parkview MC	Pueblo	189	0	0	Same	182	5	6.6	Worse	179	3	3.7	Same
Pioneers MC	Meeker	3	***	***	***	0	***	***	***	0	***	***	***
Poudre Valley Hospital	Ft Collins	240	4	2.4	Same	263	5	3.2	Worse	218	2	1.7	Same
Presbyterian St Luke's MC	Denver	532	0	0	Same	479	3	1.4	Same	219	3	2.6	Same
Prowers MC	Lamar	5	***	***	***	1	***	***	***	0	***	***	***
Rose MC	Denver	1,537	3	0.4	Same	1,862	4	0.4	Same	1,512	4	0.6	Same
San Luis Valley Regional MC	Alamosa	42	0	0	Same	27	0	0	Same	21	0	0	Same
SCLH Good Samaritan MC	Lafayette	506	5	1.9	Same	370	3	1.8	Same	350	3	1.9	Same
SCLH Lutheran MC	Wheat Ridge	443	9	4.1	Worse	408	9	3.9	Worse	419	7	3.2	Worse
SCLH Platte Valley MC	Brighton	65	0	0	Same	70	0	0	Same	50	3	7.3	Worse
SCLH St Joseph Hospital	Denver	1,029	15	1.9	Worse	1,035	16	2.3	Worse	1,055	19	2.9	Worse

Surgical Site Infections in Breast Procedures in Hospitals (In- and Outpatient Combined): Aug. 1, 2013 - July 31, 2016													
Health Facility and City		August 2013 - July 2014				August 2014 - July 2015				August 2015 - July 2016			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
SCLH St Mary's Hospital	Grand Junction	145	1	1.4	Same	225	1	0.9	Same	160	1	1.3	Same
Sky Ridge MC	Lone Tree	562	6	1.1	Same	695	13	1.8	Same	664	5	0.9	Same
Southeast Colorado Hospital	Springfield	1	***	***	***	0	***	***	***	0	***	***	***
Southwest Memorial Hospital	Cortez	35	0	0	Same	27	0	0	Same	18	***	***	***
Spanish Peaks Regional Health Center	Walsenburg	3	***	***	***	0	***	***	***	1	***	***	***
St Anthony Summit MC	Frisco	1	***	***	***	4	***	***	***	7	***	***	***
Sterling Regional MC	Sterling	17	***	***	***	18	***	***	***	18	***	***	***
Swedish MC	Englewood	98	0	0	Same	78	0	0	Same	78	0	0	Same
The Memorial Hospital	Craig	0	***	***	***	2	***	***	***	0	***	***	***
University of Colorado Hospital	Aurora	434	2	0.2	Better	614	5	0.5	Same	894	10	0.5	Same
Vail Valley MC	Vail	92	2	2.1	Same	119	3	2.7	Same	75	1	1.2	Same
Valley View Hospital	Glenwood Springs	73	0	0	Same	64	0	0	Same	117	1	0.8	Same
Wray Community Hospital	Wray	1	***	***	***	0	***	***	***	4	***	***	***
Yampa Valley MC	Steamboat Springs	28	0	0	Same	42	0	0	Same	46	3	5.5	Worse
Yuma District Hospital	Yuma	4	***	***	***	3	***	***	***	7	***	***	***

Note: SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for procedure risk factors; MC=medical center; SCLH=Sisters of Charity of Leavenworth Health System.
National comparison based on the indirect adjustment of modeled risk factors for each procedure type.
*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of less than 1.
Infections for facilities performing less than 20 procedures per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.
Source: National Health Care Safety Network (NHSN) Database.

Table 17: Number of Surgical Site Infections and Standardized Infection Ratios Breast Surgeries in Ambulatory Surgery Centers – Colorado, August 2013 –July 2016

Surgical Site Infections in Breast Procedures in ASCs (Outpatient): Aug. 1, 2013 - July 31, 2016													
Health Facility and City		August 2013 - July 2014				August 2014 - July 2015				August 2015 - July 2016			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
ASC Durango at Mercy MC	Durango	15	***	***	***	13	***	***	***	9	***	***	***
Aberdeen ASC	Pueblo	310	0	0	Same	339	0	0	Same	342	0	0	Same
Arkansas Valley Surgery Center	Canon City	4	***	***	***	2	***	***	***	1	***	***	***
Audubon ASC	CO Springs	5	***	***	***	1	***	***	***	35	0	0	Same
Audubon ASC at St. Francis	CO Springs	6	***	***	***	4	***	***	***	3	***	***	***
Avista Surgery Center	Boulder	491	4	1.9	Same	565	2	0.8	Same	300	0	0	Same
Black Canyon Surgical Center	Montrose	2	***	***	***	2	***	***	***	1	***	***	***
Centrum Surgical Center	Greenwood Village	456	1	0.6	Same	381	0	0	Same	301	0	0	Same
Clear Creek Surgery Center	Wheat Ridge	16	***	***	***	5	***	***	***	8	***	***	***
Colorado Springs Surgery Center	CO Springs	177	1	1.3	Same	145	1	1.6	Same	215	0	0	Same
Crown Point Surgery Center	Parker	228	1	0.9	Same	239	1	0.8	Same	282	0	0	Same
Denver Midtown Surgery Center	Denver	22	0	0	Same	27	0	0	Same	64	0	0	Same
1st Choice Outpatient Surgery Center at Community Hospital	Grand Junction	65	0	0	Same	0	***	***	***	0	***	***	***
Grand Valley Surgical Center	Grand Junction	300	4	2.5	Same	249	0	0	Same	286	0	0	Same
Harmony ASC	Ft Collins	339	0	0	Same	359	0	0	Same	545	0	0	Same
Kaiser Lone Tree Surgery Center	Lone Tree	13	***	***	***	74	3	7.8	Worse	161	3	3.6	Same
Kaiser Permanente ASC	Denver	202	1	0.9	Same	160	2	2.3	Same	379	3	1.3	Same
Midvalley ASC	Basalt	105	0	0	Same	78	0	0	Same	49	0	0	Same
Longmont Surgery Center	Longmont	0	***	***	***	1	***	***	***	0	***	***	***
North Suburban Surgery Center	Thornton	35	0	0	Same	9	***	***	***	0	***	***	***
Northwest Regional Surgery Center	Westminster	71	0	0	Same	75	1	1.6	Same	64	0	0	Same
Park Meadows Cosmetic Surgery	Lone Tree	218	0	0	Same	243	1	0.8	Same	485	0	0	Same
Parkwest Surgery Center	Pueblo	4	***	***	***	3	***	***	***	4	***	***	***
Peak One Surgery Center	Frisco	0	***	***	***	4	***	***	***	1	***	***	***

Surgical Site Infections in Breast Procedures in ASCs (Outpatient): Aug. 1, 2013 - July 31, 2016													
Health Facility and City		August 2013 - July 2014				August 2014 - July 2015				August 2015 - July 2016			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Pueblo Surgery Center	Pueblo	27	0	0	Same	0	***	***	***	1	***	***	***
Red Rocks Surgery Center	Golden	66	0	0	Same	95	0	0	Same	117	0	0	Same
Renewal Surgery Center	Lone Tree	22	0	0	Same	347	0	0	Same	529	0	0	Same
Rocky Mountain Surgery Center	Englewood	4	***	***	***	2	***	***	***	2	***	***	***
Rose Surgical Center	Denver	151	0	0	Same	182	0	0	Same	137	0	0	Same
Sky Ridge Surgical Center	Lone Tree	1	***	***	***	0	***	***	***	1	***	***	***
Skyline Surgery Center	Loveland	167	0	0	Same	268	0	0	Same	291	0	0	Same
Southwest Colorado Surgical Center	Cortez	1	***	***	***	3	***	***	***	0	***	***	***
Summit View Surgery Center	Littleton	123	1	1.8	Same	127	0	0	Same	115	0	0	Same
Surgery Center At Lutheran	Wheat Ridge	81	0	0	Same	88	0	0	Same	46	0	0	Same
Surgery Center Of Ft Collins	Ft Collins	147	0	0	Same	116	0	0	Same	27	0	0	Same
Surgery Center of the Rockies	Aurora	117	0	0	Same	94	0	0	Same	91	1	2.5	Same
Surgical Center At Premier	CO Springs	355	0	0	Same	145	2	3.6	Same	33	0	0	Same
Surgical Center of the Rockies	CO Springs	142	2	3	Same	273	2	1.5	Same	232	2	1.4	Same
UCH Memorial Surgery Center At Printers Park	CO Springs	619	9	2.8	Worse	684	4	1.1	Same	683	5	1.4	Same

The standardized infection ratio (SIR) is the ratio of observed to expected infections adjusted for procedure risk factors.
National comparison based on the indirect adjustment of modeled risk factors for each procedure type.
*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of less than 1.
Infections for facilities performing less than 20 procedures per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.
Source: National Health Care Safety Network (NHSN) Database.

Central line-associated bloodstream infections

Overview

Central line-associated bloodstream infections (CLABSI) are associated with specific intravascular catheters or central lines that must be in place at the time of, or within 48 hours before the onset of the infection. A central line is an intravascular catheter (tube in a vein or artery) that terminates at or close to the heart or in one of the great vessels (e.g., aorta, superior vena cava). A peripheral line is a similar tube in a vein or artery that does not enter a great vessel, is a smaller diameter tube, and is typically used for shorter periods of intravenous access. Both central lines and peripheral lines can be used to infuse fluids or medications, withdraw blood or monitor fluid volume in patients. However, central lines are typically placed when intravenous access is needed for longer time periods, larger volumes of fluids, or access for dialysis is needed. An umbilical catheter (i.e., a tube placed in the umbilical cord) is a central vascular catheter inserted through the umbilical artery or vein in a neonate (infant ≤ 30 days old). Central lines can be either permanent or temporary. Permanent lines are those that are tunneled under the skin before entering a great vessel. These can include certain dialysis lines and implanted catheters such as a port. Temporary lines are those that are not tunneled.

All patients with central lines are at risk for CLABSI. However, certain groups are at higher risk for infection: elderly, neonates, dialysis patients, patients with weak immune systems (e.g., cancer patients, transplant patients), diabetics and patients with burn injuries[10-12].

Colorado requires that all adult critical care units, neonatal critical care units Level II/III and III, long- term acute care hospitals (LTAC), and inpatient rehabilitation hospitals and wards report CLABSI data into NHSN.

Every CLABSI data table below lists all Colorado hospitals and hospital unit(s) reporting central line use, their cities, number of central line days per year, number of infections, SIRs, and comparisons to national infection rates. The number of central line days is the total number of days a central line was in place for patients in the unit during the reporting period (for example, if three patients each had a central line for 10 days, the number of central line days is 30). The three categories summarizing how a Colorado facility compares to the national infection rate for that unit are:

1. Statistically lower infection rate than the national rate (**better**);
2. Statistically similar infection rate as the national rate (**same)**; or
3. Statistically higher infection rate than the national rate (**worse**).

Adult critical care units

Adult critical care units (CCU) report central line data by facility type, central line type and unit type. This differentiation enables fairer comparisons between health facilities by accounting for differences in care and patients' risk for infection that affect infection rates. Hospitals identify their CCU by counting the type of patients cared for in the unit. For instance, if a medical CCU serves non-surgical patients and the majority of their critical care patients are non-surgical, that facility would have a medical CCU according to the NHSN definitions.

The statewide CLABSI rate in adult intensive care units remains similar to the national average.

Results

Table 18 shows facility specific data for **CLABSI** attributed to adult critical care units from Aug. 1, 2013 through July 31, 2016.

Fifty-nine adult critical care units in 47 Colorado hospitals reported 103,816 central line days in the last reporting period. Of the 59 units, 22 reported zero CLABSI. This year, two hospitals had CLABSI rates worse than the national average and all others had rates similar to national rates. The aggregate statewide CLABSI rate in adult critical care units has remained similar to the national average.

Table 18: Number of Central Line-Associated Bloodstream Infections in Adult Critical Care Units – Colorado, August 2013 – July 2016

Central Line-Associated Blood Stream Infections (CLABSI): Aug.1, 2013 – July 31, 2016														
Health Facility, City, Unit Type			August 2013 – July 2014				August 2014 – July 2015				August 2015 – July 2016			
			No. of CL Days	No. of Infections	SIR	National Comparison	No. of CL Days	No. of Infections	SIR	National Comparison	No. of CL Days	No. of Infections	SIR	National Comparison
Arkansas Valley Regional MC	La Junta	MICU/SICU	198	0	0	Same	92	***	***	***	57	0	0	Same
Aspen Valley Hospital	Aspen	MICU/SICU	28	***	***	***	9	***	***	***	39	***	***	***
Boulder Community Hospital	Boulder	MICU/SICU	1,926	0	0	Same	296	0	0	Same	0	***	***	***
Boulder Community Hospital-Foothills	Boulder	MICU/SICU	0	***	***	***	1,531	1	0.8	Same	2,320	1	0.5	Same
Castle Rock Adventist	Castle Rock	MICU/SICU	296	0	0	Same	389	0	0	Same	567	2	4.4	Same
Centura Avista Adventist Hospital	Louisville	MICU/SICU	401	0	0	Same	480	0	0	Same	442	0	0	Same
Centura Littleton Adventist Hospital	Littleton	MICU/SICU	3,291	3	1.1	Same	2,879	3	1.3	Same	2,501	0	0	Same
Centura Penrose St Francis Health	CO Springs	MICU/SICU	3,922	2	0.6	Same	3,640	3	1	Same	3,175	2	0.8	Same
Centura Porter Adventist Hospital	Denver	MICU/SICU	4,043	0	0	Same	3,991	0	0	Same	3,602	0	0	Same
Centura St Anthony Central Hospital	Denver	MICU/SICU	1,895	2	1.3	Same	1,605	1	0.8	Same	1,647	2	1.5	Same
		MICU	2,401	1	0.4	Same	1,838	1	0.5	Same	1,968	3	1.4	Same
		NEURO ICU	1,931	2	1.2	Same	1,902	5	2.9	Same	1,838	1	0.6	Same
		CSICU	1,839	0	0	Same	1,444	1	0.9	Same	1,614	0	0	Same
		Trauma ICU	1,572	4	1.8	Same	1,515	1	0.5	Same	1,632	0	0	Same
Centura St Anthony North Hospital	Westminster	MICU/SICU	1,668	2	1.1	Same	1,651	0	0	Same	1,620	1	0.6	Same
Centura St Francis MC	CO Springs	MICU/SICU	431	0	0	Same	535	0	0	Same	581	0	0	Same
Centura St Mary Corwin MC	Pueblo	MICU/SICU	1,591	1	0.8	Same	1,519	3	2.5	Same	1,858	3	2	Same
Centura St Thomas More Hospital	Canon City	MICU/SICU	117	1	10.7	Same	48	***	***	***	71	1	17.6	Same
Colorado Plains MC	Fort Morgan	MICU/SICU	19	***	***	***	9	***	***	***	29	***	***	***
Community Hospital	Grand Junction	MICU	271	1	3.3	Same	261	0	0	Same	468	0	0	Same
Delta County Memorial Hospital	Delta	MICU/SICU	416	0	0	Same	297	0	0	Same	207	0	0	Same
Denver Health MC	Denver	MICU	3,335	3	0.7	Same	2,898	4	1.2	Same	2,883	3	0.9	Same
		Trauma ICU	2,352	4	1.2	Same	2,009	5	1.8	Same	1,863	8	3.1	Worse

Central Line-Associated Blood Stream Infections (CLABSI): Aug.1, 2013 - July 31, 2016														
Health Facility, City, Unit Type			August 2013 - July 2014				August 2014 - July 2015				August 2015 - July 2016			
			No. of CL Days	No. of Infections	SIR	National Comparison	No. of CL Days	No. of Infections	SIR	National Comparison	No. of CL Days	No. of Infections	SIR	National Comparison
Heart of the Rockies Regional MC	Salida	MICU/SICU	25	***	***	***	34	***	***	***	31	***	***	***
Longmont United Hospital	Longmont	MICU/SICU	2,671	0	0	Same	2,950	0	0	Same	2,759	1	0.5	Same
McKee MC	Loveland	MICU/SICU	714	0	0	Same	721	0	0	Same	675	1	1.9	Same
MC of Aurora	Aurora	MICU/SICU	5,012	8	2	Same	4,576	2	0.5	Same	4,181	0	0	Same
MC of the Rockies-South Wing	Loveland	MICU/SICU	4,028	2	1.3	Same	4,305	1	0.5	Same	4,168	4	2.3	Same
Memorial Hospital Central	CO Springs	CCU	0	***	***	***	0	***	***	***	335	0	0	Same
		MICU/SICU	4,759	3	0.8	Same	4,879	3	0.8	Same	5,040	1	0.2	Same
Memorial Hospital North	CO Springs	MICU/SICU	309	0	0	Same	360	0	0	Same	615	1	2	Same
Mercy Regional MC	Durango	MICU/SICU	1,052	0	0	Same	1,071	1	0.8	Same	1,116	1	0.8	Same
Montrose Memorial Hospital	Montrose	MICU/SICU	341	0	0	Same	436	1	2.9	Same	311	0	0	Same
North Colorado MC	Greeley	MICU/SICU	2,506	0	0	Same	2,339	4	2.1	Same	2,053	4	2.4	Same
North Suburban MC	Thornton	MICU/SICU	2,191	0	0	Same	2,072	3	1.8	Same	1,599	1	0.8	Same
Parker Adventist Hospital	Parker	MICU/SICU	1,401	0	0	Same	1,458	0	0	Same	1,952	1	0.6	Same
Parkview MC	Pueblo	MICU/SICU	1,634	4	2.2	Same	2,457	2	0.9	Same	2,671	1	0.5	Same
		Neuro ICU	1,246	0	0	Same	1,030	1	1.1	Same	1,197	4	3.7	Worse
Poudre Valley Hospital	Fort Collins	MICU/SICU	1,446	0	0	Same	1,540	0	0	Same	1,388	0	0	Same
Presbyterian St Luke's MC	Denver	MICU/SICU	2,051	1	0.4	Same	1,767	1	0.5	Same	2,077	5	2.2	Same
Rose MC	Denver	MICU/SICU	1,851	1	0.5	Same	1,695	1	0.5	Same	1,713	2	1.1	Same
San Luis Valley Regional MC	Alamosa	MICU/SICU	235	0	0	Same	224	0	0	Same	175	0	0	Same
SCLH Good Samaritan MC	Lafayette	MICU/SICU	1,562	1	0.8	Same	1,662	1	0.8	Same	1,359	1	0.9	Same
SCLH Lutheran MC	Wheat Ridge	MICU/SICU	3,691	0	0	Same	2,860	2	0.9	Same	2,872	0	0	Same
SCLH Platte Valley MC	Brighton	MICU	313	0	0	Same	752	0	0	Same	1,027	0	0	Same
SCLH St Joseph Hospital	Denver	MICU/SICU	3,303	0	0	Same	3,321	0	0	Same	3,179	2	0.6	Same
SCLH St Mary's Hospital	Grand Junction	CSICU	5,573	5	1.1	Same	6,471	2	0.4	Same	5,494	5	1.1	Same
Sky Ridge MC	Lone Tree	MICU/SICU	2,302	0	0	Same	2,143	1	0.4	Same	2,021	0	0	Same
Southwest Memorial Hospital	Cortez	MICU/SICU	132	0	0	Same	61	0	0	Same	59	0	0	Same
St Anthony Summit MC	Frisco	MICU/SICU	34	***	***	***	55	0	0	Same	25	***	***	***
Sterling Regional MC	Sterling	MICU/SICU	120	0	0	Same	107	0	0	Same	65	0	0	Same

Central Line-Associated Blood Stream Infections (CLABSI): Aug.1, 2013 - July 31, 2016														
Health Facility, City, Unit Type			August 2013 - July 2014				August 2014 - July 2015				August 2015 - July 2016			
			No. of CL Days	No. of Infections	SIR	National Comparison	No. of CL Days	No. of Infections	SIR	National Comparison	No. of CL Days	No. of Infections	SIR	National Comparison
Swedish MC	Englewood	MICU/SICU	4,185	6	1.8	Same	5,489	6	3.5	Same	4,913	6	2.7	Same
University of Colorado Hospital	Aurora	CCU	1,575	3	1.9	Same	1,921	2	1	Same	2,004	5	2.5	Same
		MICU	4,562	11	2	Worse	4,407	8	1.5	Same	4,555	8	1.5	Same
		Neuro ICU	4,643	9	2.2	Same	4,564	2	0.5	Same	4,143	7	1.9	Same
		CSICU	3,137	0	0	Same	4,082	6	1.8	Same	3,965	4	1.3	Same
		SICU	2,517	6	2.2	Same	1,965	1	0.5	Same	2,622	6	2.1	Same
Vail Valley MC	Vail	MICU/SICU	173	0	0	Same	128	0	0	Same	78	0	0	Same
Valley View Hospital	Glenwood Springs	MICU/SICU	295	0	0	Same	363	0	0	Same	344	0	0	Same
Yampa Valley MC	Steamboat Springs	MICU/SICU	19	***	***	***	26	***	***	***	53	0	0	Same

Note: CL=central line; SIR=standardized infection ratio, the ratio of observed to expected infections adjusted for procedure risk factors; MC=medical center; SCLH=Sisters of Charity of Leavenworth Health System.
Note: MICU=Medical intensive care unit; SICU=Surgical intensive care unit; ICU= intensive care unit; CCU=Cardiac care unit; CSICU=Cardiothoracic surgical intensive care unit.
*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of less than 1.
Infections for facilities with fewer than 50 central line days per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.
National comparison based on data collected and reported by NHSN-participating hospitals from January-December, 2014.
Source: National Health Care Safety Network (NHSN) Database.

Long-term acute care hospitals

A long-term acute care hospital (LTAC) is a specialty care hospital that cares for patients with complex medical conditions requiring intense, specialized treatment for at least 25 days. These patients often transfer from critical care units in traditional hospitals. Patients in these facilities have a higher severity of illness often with multi-system complications posing a challenge for infection control.

LTAC report infection data for patients with either permanent or temporary central lines. As previously noted, permanent lines are those that are tunneled and can include certain dialysis lines and implanted catheters such as a port. Temporary lines are those that are not tunneled. Permanent lines are commonly used in LTAC patients and historically have had lower rates of infection than temporary lines.

The statewide CLABSI rate in long term acute care hospitals was better than the national rate in the prior two years. This year's statewide CLABSI rate was similar to the national average.

Results

Table 19 shows facility specific data for CLABSI in LTAC. The table contains data from Aug. 1, 2013 through July 31, 2016.

In Colorado this past year, eight LTAC reported 32,386 central line days; one reported zero CLABSI. All LTAC had rates similar to national rates. While the statewide CLABSI rate in LTAC was better than the national rate in the previous two reporting years, this year's statewide CLABSI rate was similar to the national average.

Table 19: Number of Central Line-Associated Bloodstream Infections in Long-Term Acute Care Hospitals – Colorado, August 2013 – July 2016

Central Line Associated Blood Stream Infections (CLABSI) in Long-Term Acute Care Hospitals: Aug. 1, 2013 - July 31, 2016													
Health Facility and City		August 2013 - July 2014				August 2014 - July 2015				August 2015 - July 2016			
		No. of CL Days	No. of Infections	SIR	National Comparison	No. of CL Days	No. of Infections	SIR	National Comparison	No. of CL Days	No. of Infections	SIR	National Comparison
Colorado Acute Long Term Hospital	Denver	6,012	5	0.9	Same	6,593	2	0.3	Same	7,432	7	1	Same
Craig Hospital	Englewood	2,033	1	0.5	Same	2,182	2	1	Same	2,336	0	0	Same
Kindred Aurora	Aurora	3,458	1	0.3	Same	2,976	1	0.4	Same	1,993	2	1.1	Same
Kindred Colorado Springs	CO Springs	3,944	1	0.3	Same	3,953	0	0	Same	2,837	5	2	Same
Kindred Denver South	Denver	2,495	0	0	Same	2,990	0	0	Same	2,001	2	1.1	Same
Kindred Hospital	Denver	4,177	2	0.5	Same	4,129	2	0.5	Same	5,901	10	1.9	Same
Northern Colorado Long Term Acute Hospital	Johnstown	3,295	0	0	Same	3,478	3	1.1	Same	4,207	3	3	Same
Vibra Long Term Acute Care Hospital	Thornton	4,956	4	0.9	Same	4,657	5	1.2	Same	5,421	3	0.6	Same

Note: CL=central line; SIR=standardized infection ratio, the ratio of observed to expected infections adjusted for procedure risk factors.
*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of less than 1.
Infections for facilities with fewer than 50 central line days per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.
National comparison based on data collected and reported by NHSN-participating

Rehabilitation hospitals and inpatient rehabilitation wards

Rehabilitation hospitals and inpatient rehabilitation wards care for patients who have lost function due to acute or chronic pain, musculoskeletal problems, stroke, brain or spinal cord dysfunction, catastrophic events resulting in complete or partial paralysis or need rehabilitation for other reasons. The goal for these areas is to evaluate, treat and restore optimal functioning of the patients physically and mentally.

Rehabilitation hospitals and wards report infection data for patients with either permanent or temporary central lines. Permanent lines are those that are tunneled under the skin before entering a great vessel. These can include certain dialysis lines and implanted catheters such as a port. Temporary lines are those that are not tunneled and their infection rates are higher than permanent lines.

All but two inpatient rehabilitation facilities reported zero infections and all had CLABSI rates similar to the national average.

Results

Table 20 shows facility specific data for CLABSI in rehab hospitals and wards. The table contains data from Aug. 1, 2013 through July 31, 2016.

Five rehabilitation hospitals and 12 rehab wards reported 9,101 central line days this past year. All but two facilities reported zero infections and all facilities' rates were similar to the national average.

Table 20: Number of Central Line-Associated Bloodstream Infections in Inpatient Rehabilitation Hospitals and Wards – Colorado, August 2013 – July 2016

Central Line-Associated Blood Stream Infections (CLABSI) in Inpatient Rehabilitation Hospitals and Wards: Aug. 1, 2013 - July 31, 2016													
Health Facility and City		August 2013 - July 2014				August 2014 - July 2015				August 2015 - July 2016			
		No. of CL Days	No. of Infections	SIR	National Comparison	No. of CL Days	No. of Infections	SIR	National Comparison	No. of CL Days	No. of Infections	SIR	National Comparison
Boulder Community Hospital	Boulder	506	0	0	Same	335	0	0	Same	245	0	0	Same
Centura Penrose St Francis Health	CO Springs	816	0	0	Same	630	0	0	Same	633	0	0	Same
Centura Porter Adventist Hospital	Denver	728	0	0	Same	673	0	0	Same	443	0	0	Same
Centura St Anthony Hospital	Lakewood	475	0	0	Same	545	1	9.2	Same	510	0	0	Same
Centura St Mary Corwin MC	Pueblo	101	0	0	Same	159	0	0	Same	140	0	0	Same
Denver Health MC	Denver	270	1	18.5	Same	228	0	0	Same	65	0	0	Same
HealthSouth Rehabilitation Hospital of Colorado Springs	CO Springs	701	0	0	Same	724	0	0	Same	687	0	0	Same
HealthSouth Rehabilitation Hospital of Denver	Denver	445	0	0	Same	457	0	0	Same	585	0	0	Same
Memorial Hospital Central	CO Springs	1,027	0	0	Same	761	0	0	Same	673	0	0	Same
Montrose Memorial Hospital	Montrose	148	0	0	Same	167	0	0	Same	87	0	0	Same
Northern Colorado Rehabilitation Hospital	Johnstown	972	0	0	Same	957	0	0	Same	1,200	0	0	Same
Parkview Medical Center	Pueblo	350	0	0	Same	188	0	0	Same	120	0	0	Same
SCLH St Mary's Hospital	Grand Junction	46	***	***	***	104	0	0	Same	146	1	34.2	Same
Spalding Rehabilitation Hospital	Aurora	932	0	0	Same	1,082	0	0	Same	809	0	0	Same
Spalding at PSL	Denver	1,146	0	0	Same	932	0	0	Same	1,118	0	0	Same
Swedish MC	Englewood	515	0	0	Same	387	0	0	Same	486	0	0	Same
University of Colorado Hospital	Aurora	1,349	1	3.7	Same	1,139	1	4.4	Same	1,154	1	4.3	Same

Note: CL=central line; SIR=standardized infection ratio, the ratio of observed to expected infections adjusted for procedure risk factors.
Infections for facilities with fewer than 50 central line days per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.
*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of less than 1.
National comparison based on data collected and reported by NHSN-participating hospitals from January-December, 2014
Source: National Health Care Safety Network (NHSN) Database.

Neonatal critical care units

Neonatal critical care units (NCCU) provide intensive medical care for premature and ill newborn babies. Neonatal care is classified into four levels of care, and since Level 1 and II units care for healthy newborns, they are not required to report HAI. Colorado requires only level III and level II/III units to report CLABSI data. Level III NCCU provide personnel and equipment to ensure continuous life support and comprehensive care for extremely high-risk newborns with complex critical conditions. The designation between Level III and Level II/III is defined by the NHSN reporting guidelines. If a hospital unit does not separate infants receiving Level II care from those receiving Level III care, that NCCU is reported as a Level II/III.

NCCU infants may have a central line inserted for several reasons: 1) their stay in the critical care unit can be prolonged; 2) they require intravenous nutrition and fluid replacement until their gastrointestinal system has matured or they can tolerate feedings by mouth; 3) their peripheral veins (those in the arms and legs) and scalp veins are small and unable to be used for fluids and medications for long periods of time; and 4) changing peripheral lines frequently can cause additional pain and stress for the infant and does not promote health. See above CLABSI section for descriptions of central lines versus peripheral lines. An umbilical catheter (i.e., a tube placed in the umbilical cord) is often inserted at birth to provide nutrition while monitoring fluid balance. These catheters are a type of central line inserted through the umbilical artery or vein in a neonate (infant ≤ 30 days old). In general, catheters have been associated with higher infection rates than any other central lines.

This year, the statewide CLABSI rate in neonatal critical care units was similar to the national average, an improvement over last year's rate.

Results

Table 21 shows the results of data collected in each NCCU from Aug. 1, 2013 through July 31, 2016.

Eighteen hospitals, including five Level III and 13 Level II/III NCCU, reported 19,485 central line days this past year. Of the 18 hospitals, seven reported zero CLABSI. One NCCU had a CLABSI rate worse than the national average, and all others had rates similar to the national rate. Although the statewide NCCU CLABSI rate was worse than the national average last year, this year, the statewide NCCU CLABSI rate was similar to the national average.

Table 21: Number of Central Line-Associated Bloodstream Infections in Neonatal Critical Care Units - Colorado, August 2013 – July 2016

Central Line-Associated Blood Stream Infections (CLABSI) in Neonatal Critical Care Units: Aug. 1, 2013 – July 31, 2016														
Health Facility, City, NCCU Type/Level			August 2013 – July 2014				August 2014 – July 2015				August 2015 – July 2016			
			No. of CL Days	No. of Infections	SIR	National Comparison	No. of CL Days	No. of Infections	SIR	National Comparison	No. of CL Days	No. of Infections	SIR	National Comparison
Castle Rock Adventist	Castle Rock	II/III	3	***	***	***	2	***	***	***	4	***	***	***
Centura Avista Adventist Hospital	Louisville	II/III	110	0	0	Same	197	0	0	Same	78	0	0	Same
Centura Littleton Adventist Hospital	Littleton	III	169	0	0	Same	61	0	0	Same	123	1	5.9	Same
Centura St Francis MC	CO Springs	II/III	1,431	1	0.6	Same	1,511	1	0.5	Same	1,514	0	0	Same
Children's Hospital Colorado	Aurora	III	4,894	4	0.9	Same	4,863	11	2.5	Worse	6,107	13	2.7	Worse
Denver Health MC	Denver	II/III	1,036	4	4.8	Worse	1,297	6	5.1	Worse	1,251	3	3.1	Same
MC of Aurora	Aurora	II/III	58	0	0	Same	47	***	***	***	10	***	***	***
Memorial Hospital Central	CO Springs	III	0	***	***	***	319	0	0	Same	1,747	0	0	Same
Parker Adventist Hospital	Parker	II/III	85	0	0	Same	74	0	0	Same	28	***	***	***
Poudre Valley Hospital	Fort Collins	II/III	755	0	0	Same	859	0	0	Same	831	0	0	Same
Presbyterian St Luke's MC	Denver	III	4,311	3	0.6	Same	4,439	8	1.6	Same	3,928	4	0.9	Same
Rose MC	Denver	II/III	269	1	3	Same	242	0	0	Same	147	0	0	Same
SCLH Lutheran MC	Wheat Ridge	II/III	226	0	0	Same	144	1	7.9	Same	129	1	8.2	Same
SCLH St Joseph Hospital	Denver	II/III	1,126	3	2.1	Same	1,243	1	0.7	Same	1,172	1	0.6	Same
SCLH St Mary's Hospital	Grand Junction	III	622	0	0	Same	592	1	2	Same	418	1	2.6	Same
Sky Ridge MC	Lone Tree	II/III	188	0	0	Same	195	1	5.1	Same	130	1	6.6	Same
Swedish MC	Englewood	II/III	107	0	0	Same	291	0	0	Same	202	0	0	Same
University of Colorado Hospital	Aurora	II/III	1,778	0	0	Same	1,596	3	1.4	Same	1,750	0	0	Same

Note: CL=central line; SIR=standardized infection ratio, the ratio of observed to expected infections adjusted for procedure risk factors; MC=medical center; SCLH=Sisters of Charity of Leavenworth Health System.

Infections for facilities with fewer than 50 central line days per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.

*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of less than 1.

National comparison based on data collected and reported by NHSN-participating hospitals from January-December, 2014.

Source: National Health Care Safety Network (NHSN) Database

Dialysis-related infections

Overview

According to the National Institute of Diabetes and Digestive and Kidney Diseases 2013 figures, more than 20 million people aged 20 and older have chronic kidney disease in the United States. In 2009, more than 871,000 patients in the United States received chronic dialysis treatment.[13]

Surveillance for dialysis-related infections in Colorado occurs within outpatient dialysis centers only and excludes peritoneal and home dialysis. The outpatient facilities monitored may be dedicated, stand-alone facilities, hospital-based or affiliated units that primarily serve this patient population. The reporting of dialysis related infections began in March 2010, and currently there are 71 dialysis centers reporting to NHSN.

Dialysis centers in Colorado monitor patients for any of three specific events that must be reported: 1) an outpatient start of an intravenous antibiotic, 2) a positive blood culture, or 3) pus, redness or increased swelling at the vascular access site. This report depicts counts and rates for two types of dialysis related infections: access-related bloodstream infections (ARB) and local access infections (LAI). An ARB, which poses more serious health implications and requires higher levels of care, is determined by the presence of a microorganism identified in a blood culture, and the source of infection is reported as the vascular access site. An LAI is defined as the presence of pus, redness or swelling of the vascular access site without the presence of an ARB. Although an LAI is not as severe as an ARB, antibiotics typically are given in either case.

Each table below lists the dialysis center's name, city, number of dialysis patients per month (patient months), numbers and rates of ARB and LAI, and comparisons to the national average (for ARB only). Currently, no national averages have been established for LAI. The infection rate used is the number of infections per 100 patient-months. The three categories that indicate how a Colorado dialysis center's infection rates compare to national infection rates are:

1. Statistically fewer infections than expected based on national infection rates (**better**);
2. Statistically similar infections as expected based on the national infection rates (**same)**; or
3. Statistically more infections than expected based on national infection rates (**worse**).

This year, the statewide rate of dialysis-related bloodstream infections remained similar to the national average.

Results

Tables 22 and 23 show the number and rates of ARB and LAI for each outpatient dialysis treatment center in Colorado. The reporting period is Aug. 1, 2013 through July 31, 2016. This

year, while we used a more recent national ARB rate (from 2014 data) for the national comparison, Colorado's aggregate ARB rate was similar to the national average.

Numbers and rates of dialysis related infections have declined over the last three years.

Seventy-two dialysis treatment centers submitted dialysis infection data into NHSN this past year. Similar to last year, this year's statewide ARB rate was the same as the national average. Thirteen facilities had zero ARB infections. Three centers had rates worse than the national average and all others were similar to the national rate. The facility-specific LAI counts and rates presented in Table 22 below show nine facilities with zero LAI (compared to eight last year and six the year before). While the statewide LAI rate is 0.7 (compared to 0.9 last year and 1.3 the year before) per 100 patient months, national LAI rates are not yet available to provide comparisons.

For both ARB and LAI, the numbers and rates of infections have declined over the last three years.

Table 22: Number and Rates of Dialysis Access-Related Bloodstream Infections in Outpatient Dialysis Centers – Colorado, August 2013 – July 2016

Dialysis Access-Related Bloodstream infections: Aug. 1, 2013 - July 31, 2016													
Dialysis Center and Region		August 2013- July 2014				August 2014-July 2015				August 2015- July 2016			
		No. of Patient Months	No. of Infections	Rate	National Comparison	No. of Patient Months	No. of Infections	Rate	National Comparison	No. of Patient Months	No. of Infections	Rate	National Comparison
AR Kidney Ctr Of Arvada	Arvada	1,101	10	0.9	Same	1,162	0	0	Better	1,086	1	0.1	Same
AR Kidney Ctr Of Bear Creek	Lakewood	366	2	0.5	Same	428	1	0.2	Same	432	3	0.7	Same
AR Kidney Ctr Of Lafayette	Lafayette	548	3	0.5	Same	607	4	0.7	Same	656	5	0.8	Same
AR Kidney Ctr Of Lakewood	Lakewood	910	4	0.4	Same	904	8	0.9	Same	822	6	0.7	Same
AR Kidney Ctr Of Longmont	Longmont	980	5	0.5	Same	963	7	0.7	Same	888	5	0.6	Same
AR Kidney Ctr Of Northridge	Westminster	80	2	2.5	Same	243	0	0	Same	265	1	0.4	Same
AR Kidney Ctr Of Parker	Parker	101	0	0	Same	281	2	0.7	Same	368	3	0.8	Same
AR Kidney Ctr Of Wheat Ridge	Wheat Ridge	0	***	***	***	1	***	***	***	262	0	0	Same
AR Kidney Ctr On Main	Longmont	363	0	0	Same	358	2	0.6	Same	325	0	0	Same
AR Kidney Ctr Westminster	Westminster	1,368	4	0.3	Same	1,361	3	0.2	Same	1,400	6	0.4	Same
AR Thornton Kidney Ctr	Thornton	535	4	0.7	Same	573	10	1.7	Same	581	7	1.2	Same
Children's Hospital Colorado	Denver	114	3	2.6	Same	87	0	0	Same	52	2	3.8	Same
Davita Alamosa	Alamosa	567	3	0.5	Same	569	8	1.4	Same	593	2	0.3	Same
Davita Arvada	Arvada	406	6	1.5	Worse	289	4	1.4	Same	233	0	0	Same
Davita Aurora	Aurora	1,456	18	1.2	Worse	1,437	12	0.8	Same	1,508	13	0.9	Same
Davita Belcaro	Denver	596	9	1.5	Worse	581	13	2.2	Worse	589	8	1.4	Worse
Davita Black Canyon	Montrose	277	3	1.1	Same	316	3	0.9	Same	339	0	0	Same
Davita Boulder	Boulder	287	1	0.3	Same	271	4	1.5	Same	259	1	0.4	Same
Davita Brighton	Brighton	587	11	1.9	Worse	650	5	0.8	Same	657	3	0.5	Same
Davita Castle Rock (Red Hawk)	Castle Rock	86	0	0	Same	197	2	1	Same	268	2	0.7	Same
Davita Commerce City	Commerce City	458	5	1.1	Same	472	7	1.5	Worse	487	2	0.4	Same
Davita Cortez	Cortez	671	2	0.3	Same	658	0	0	Same	645	0	0	Same
Davita Denver	Denver	806	6	0.7	Same	777	6	0.8	Same	703	5	0.7	Same
Davita Durango	Durango	390	4	1	Same	350	5	1.4	Same	396	5	1.3	Worse
Davita East Aurora	Aurora	1,068	7	0.7	Same	990	4	0.4	Same	1,047	7	0.7	Same

Dialysis Access-Related Bloodstream infections: Aug. 1, 2013 - July 31, 2016													
Dialysis Center and Region		August 2013- July 2014				August 2014-July 2015				August 2015- July 2016			
		No. of Patient Months	No. of Infections	Rate	National Comparison	No. of Patient Months	No. of Infections	Rate	National Comparison	No. of Patient Months	No. of Infections	Rate	National Comparison
Davita Englewood	Englewood	545	3	0.6	Same	584	0	0	Same	490	2	0.4	Same
Davita Grand Junction	Grand Junction	753	4	0.5	Same	751	4	0.5	Same	713	3	0.4	Same
Davita Lakewood	Lakewood	994	14	1.4	Worse	1,087	10	0.9	Same	1,022	2	0.2	Same
Davita Lakewood Crossing	Lakewood	1,070	12	1.1	Worse	984	15	1.5	Worse	1,040	4	0.4	Same
Davita Littleton	Littleton	698	1	0.1	Same	664	1	0.2	Same	665	1	0.2	Same
Davita Lonetree	Lonetree	338	3	0.9	Same	334	2	0.6	Same	327	1	0.3	Same
Davita Longmont	Longmont	242	4	1.7	Worse	258	1	0.4	Same	235	0	0	Same
Davita Loveland Central	Loveland	162	11	6.8	Worse	206	3	1.5	Same	241	0	0	Same
Davita Lowry	Denver	1,018	5	0.5	Same	1,000	7	0.7	Same	1,019	7	0.7	Same
Davita Mesa County	Grand Junction	256	2	0.8	Same	256	3	1.2	Same	240	2	0.8	Same
Davita North CO Springs	CO Springs	219	1	0.5	Same	293	1	0.3	Same	338	2	0.6	Same
Davita North Metro	Westminster	489	6	1.2	Same	482	1	0.2	Same	553	1	0.2	Same
Davita Northeastern CO	Sterling	379	5	1.3	Same	401	2	0.5	Same	424	1	0.2	Same
Davita Parker	Parker	429	6	1.4	Same	507	1	0.2	Same	561	0	0	Same
Davita Pikes Peak	CO Springs	965	6	0.6	Same	980	7	0.7	Same	1,086	10	0.9	Same
Davita Printers Place	CO Springs	199	3	1.5	Same	319	0	0	Same	461	3	0.7	Same
Davita Sable	Aurora	810	10	1.2	Same	1,035	2	0.2	Same	1,062	7	0.7	Same
Davita South Denver	Denver	536	8	1.5	Worse	463	6	1.3	Same	458	7	1.5	Worse
Davita Southwest Denver	Denver	364	2	0.5	Same	392	2	0.5	Same	391	0	0	Same
Davita Thornton	Thornton	856	13	1.5	Worse	865	4	0.5	Same	859	2	0.2	Same
Davita West Lakewood	Lakewood	51	1	2	Same	171	1	0.6	Same	254	2	0.8	Same
Davita Westminster	Westminster	439	3	0.7	Same	341	5	1.5	Same	343	3	0.9	Same
Denver Women's Correctional Facility	Denver	290	0	0	Same	288	0	0	Same	252	0	0	Same
Dialysis Clinic Inc Grand Junction	Grand Junction	321	0	0	Same	330	0	0	Same	339	1	0.3	Same
Dialysis Clinic Inc Montrose	Montrose	422	2	0.5	Same	390	0	0	Same	385	0	0	Same
DSI Renal Pueblo	Pueblo	489	2	0.4	Same	496	1	0.2	Same	592	3	0.5	Same
FMC Canon City	Canon city	442	1	0.2	Same	442	2	0.5	Same	443	2	0.5	Same
FMC Denver Central	Denver	959	3	0.3	Same	821	2	0.2	Same	627	4	0.6	Same
FMC East Denver	Denver	1,273	16	1.3	Same	1,168	5	0.4	Same	1,161	6	0.5	Same
FMC Fort Collins	Ft Collins	783	5	0.6	Same	697	2	0.3	Same	820	2	0.2	Same
FMC Greeley	Greeley	1,422	2	0.1	Better	1,173	5	0.4	Same	983	4	0.4	Same

Dialysis Access-Related Bloodstream infections: Aug. 1, 2013 - July 31, 2016													
Dialysis Center and Region		August 2013- July 2014				August 2014-July 2015				August 2015- July 2016			
		No. of Patient Months	No. of Infections	Rate	National Comparison	No. of Patient Months	No. of Infections	Rate	National Comparison	No. of Patient Months	No. of Infections	Rate	National Comparison
FMC La Junta	La junta	423	0	0	Same	353	4	1.1	Same	417	1	0.2	Same
FMC Lamar	Lamar	291	1	0.3	Same	252	0	0	Same	251	2	0.8	Same
FMC Loveland	Loveland	585	7	1.2	Same	519	4	0.8	Same	521	4	0.8	Same
FMC North Greeley	Greeley	Not yet operating				366	0	0	Same	483	1	0.2	Same
FMC Pavilion	Denver	578	10	1.7	Same	864	4	0.5	Same	878	3	0.3	Same
FMC Pueblo	Pueblo	701	6	0.9	Same	699	7	1	Same	658	1	0.2	Same
FMC Pueblo South	Pueblo	1,049	9	0.9	Same	985	8	0.8	Same	1,010	7	0.7	Same
FMC Pueblo West	Pueblo	291	0	0	Same	294	0	0	Same	255	0	0	Same
FMC Rocky Mountain	Denver	886	5	0.6	Same	827	1	0.1	Same	853	3	0.4	Same
FMC South Denver	Denver	4	***	***	***	87	0	0	Same	189	1	0.5	Same
FMC Stapleton	Denver	546	8	1.5	Same	551	0	0	Same	607	6	1	Same
FMC Walsenburg	Walsenburg	251	1	0.4	Same	214	1	0.5	Same	220	2	0.9	Same
FMC West Hampden	Denver	52	0	0	Same	94	0	0	Same	154	0	0	Same
Liberty Colorado Springs Central	CO Springs	1,113	8	0.7	Same	1,130	3	0.3	Same	1,110	3	0.3	Same
Liberty Colorado Springs North	CO Springs	495	1	0.2	Same	560	2	0.4	Same	794	5	0.6	Same
Liberty Colorado Springs South	CO Springs	790	12	1.5	Same	895	6	0.7	Same	977	6	0.6	Same

Note: AR=American Renal, FMC=Fresenius Medical Care. Facility dialysis-related infection rates are per 100 patient months.
Data are limited to the following access types: fistula, graft, tunneled central line, and non-tunneled central line.
National comparison based on data collected and reported by NHSN-participating hospitals from January-December, 2014.

Infection data for dialysis centers with fewer than 50 patient months in a 12-month period are suppressed to protect confidential health information. These dialysis centers have met the reporting requirements.

*** Indicates value not shown due to suppression of infection data.

Source: National Healthcare Safety Network (NHSN) Database.

Table 23: Number and Rates of Dialysis Local Access Infections in Outpatient Dialysis Centers - Colorado, August 2013 – July 2016

Dialysis-Related Infections: Local Access Infections: Aug. 1, 2013 - July 31, 2016									
Dialysis Center and City		August 2013- July 2014			August 2014-July 2015			August 2015- July 2016		
		No. of Patient Months	No. of Infections	Rate	No. of Patient Months	No. of Infections	Rate	No. of Patient Months	No. of Infections	Rate
AR Kidney Ctr Of Arvada	Arvada	1,101	28	2.5	1,162	14	1.2	1,086	11	1
AR Kidney Ctr Of Bear Creek	Lakewood	366	11	3	428	6	1.4	432	5	1.2
AR Kidney Ctr Of Lafayette	Lafayette	548	0	0	607	1	0.2	656	1	0.2
AR Kidney Ctr Of Lakewood	Lakewood	910	27	3	904	8	0.9	822	6	0.7
AR Kidney Ctr Of Longmont	Longmont	980	5	0.5	963	11	1.1	888	9	1
AR Kidney Ctr Of Northridge	Westminster	80	1	1.3	243	2	0.8	265	2	0.8
AR Kidney Ctr Of Parker	Parker	101	2	2	281	7	2.5	368	4	1.1
AR Kidney Center Of Wheat Ridge	Wheat Ridge	0	***	***	1	***	***	262	5	1.9
AR Kidney Ctr On Main	Longmont	363	7	1.9	358	6	1.7	325	2	0.6
AR Kidney Ctr Westminster	Westminster	1,368	26	1.9	1,361	19	1.4	1,400	8	0.6
AR Thornton Kidney Ctr	Thornton	535	14	2.6	573	8	1.4	581	5	0.9
Children's Hospital Colorado	Denver	114	2	1.8	87	5	5.7	52	1	1.9
Davita Alamosa	Alamosa	567	6	1.1	569	8	1.4	593	9	1.5
Davita Arvada	Arvada	406	9	2.2	289	5	1.7	233	2	0.9
Davita Aurora	Aurora	1,456	12	0.8	1,437	8	0.6	1,508	17	1.1
Davita Belcaro	Denver	596	1	0.2	581	2	0.3	589	3	0.5
Davita Black Canyon	Montrose	277	6	2.2	316	1	0.3	339	0	0
Davita Boulder	Boulder	287	7	2.4	271	0	0	259	2	0.8
Davita Brighton	Brighton	587	12	2	650	12	1.8	657	9	1.4
Davita Castle Rock (Red Hawk)	Castle Rock	86	2	2.3	197	2	1	268	4	1.5
Davita Commerce City	Commerce City	458	4	0.9	472	4	0.8	487	1	0.2
Davita Cortez	Cortez	671	11	1.6	658	1	0.2	645	3	0.5
Davita Denver	Denver	806	25	3.1	777	16	2.1	703	16	2.3
Davita Durango	Durango	390	6	1.5	350	2	0.6	396	1	0.3
Davita East Aurora	Aurora	1,068	12	1.1	990	7	0.7	1,047	12	1.1
Davita Englewood	Englewood	545	4	0.7	584	3	0.5	490	0	0
Davita Grand Junction	Grand Junction	753	13	1.7	751	8	1.1	713	6	0.8
Davita Lakewood	Lakewood	994	26	2.6	1,087	28	2.6	1,022	8	0.8
Davita Lakewood Crossing	Lakewood	1,070	15	1.4	984	18	1.8	1,040	12	1.2

Dialysis-Related Infections: Local Access Infections: Aug. 1, 2013 – July 31, 2016										
Dialysis Center and City		August 2013- July 2014			August 2014-July 2015			August 2015- July 2016		
		No. of Patient Months	No. of Infections	Rate	No. of Patient Months	No. of Infections	Rate	No. of Patient Months	No. of Infections	Rate
Davita Littleton	Littleton	698	4	0.6	664	8	1.2	665	3	0.5
Davita Lonetree	Lonetree	338	5	1.5	334	1	0.3	327	5	1.5
Davita Longmont	Longmont	242	5	2.1	258	1	0.4	235	4	1.7
Davita Loveland Central	Loveland	162	1	0.6	206	0	0	241	4	1.7
Davita Lowry	Denver	1,018	15	1.5	1,000	7	0.7	1,019	2	0.2
Davita Mesa County	Grand Junction	256	14	5.5	256	4	1.6	240	3	1.3
Davita North CO Springs	CO Springs	219	2	0.9	293	0	0	338	4	1.2
Davita North Metro	Westminster	489	13	2.7	482	5	1	553	6	1.1
Davita Northeastern CO	Sterling	379	2	0.5	401	5	1.2	424	8	1.9
Davita Parker	Parker	429	12	2.8	507	9	1.8	561	9	1.6
Davita Pikes Peak	CO Springs	965	8	0.8	980	6	0.6	1,086	10	0.9
Davita Printers Place	CO Springs	199	0	0	319	2	0.6	461	2	0.4
Davita Sable	Aurora	810	21	2.6	1,035	10	1	1,062	13	1.2
Davita South Denver	Denver	536	12	2.2	463	2	0.4	458	2	0.4
Davita Southwest Denver	Denver	364	7	1.9	392	5	1.3	391	2	0.5
Davita Thornton	Thornton	856	11	1.3	865	3	0.3	859	6	0.7
Davita West Lakewood	Lakewood	51	0	0	171	0	0	254	2	0.8
Davita Westminster	Westminster	439	4	0.9	341	1	0.3	343	1	0.3
Denver Women's Correctional Facility	Denver	290	0	0	288	0	0	252	0	0
Dialysis Clinic Inc Grand Junction	Grand Junction	321	2	0.6	330	3	0.9	339	3	0.9
Dialysis Clinic Inc Montrose	Montrose	422	6	1.4	390	5	1.3	385	4	1
DSI Renal Pueblo	Pueblo	489	3	0.6	496	1	0.2	592	3	0.5
FMC Canon City	Canon city	442	1	0.2	442	4	0.9	443	0	0
FMC Denver Central	Denver	959	13	1.4	821	5	0.6	627	5	0.8
FMC East Denver	Denver	1,273	11	0.9	1,168	16	1.4	1,161	10	0.9
FMC Fort Collins	Ft Collins	783	8	1	697	4	0.6	820	0	0
FMC Greeley	Greeley	1,422	4	0.3	1,173	1	0.1	983	1	0.1
FMC La Junta	La junta	423	0	0	353	0	0	417	0	0

Dialysis-Related Infections: Local Access Infections: Aug. 1, 2013 – July 31, 2016										
Dialysis Center and City		August 2013- July 2014			August 2014-July 2015			August 2015- July 2016		
		No. of Patient Months	No. of Infections	Rate	No. of Patient Months	No. of Infections	Rate	No. of Patient Months	No. of Infections	Rate
FMC Lamar	Lamar	291	1	0.3	252	2	0.8	251	2	0.8
FMC Loveland	Loveland	585	1	0.2	519	5	1	521	1	0.2
FMC North Greeley	Greeley	Not yet operating			366	1	0.3	483	1	0.2
FMC Pavilion	Denver	578	5	0.9	864	6	0.7	878	2	0.2
FMC Pueblo	Pueblo	701	3	0.4	699	2	0.3	658	0	0
FMC Pueblo South	Pueblo	1,049	5	0.5	985	5	0.5	1,010	5	0.5
FMC Pueblo West	Pueblo	291	0	0	294	0	0	255	0	0
FMC Rocky Mountain	Denver	886	7	0.8	827	10	1.2	853	2	0.2
FMC South Denver	Denver	4	***	***	87	3	3.4	189	3	1.6
FMC Stapleton	Denver	546	3	0.5	551	4	0.7	607	1	0.2
FMC Walsenburg	Walsenburg	251	4	1.6	214	1	0.5	220	2	0.9
FMC West Hampden	Denver	52	0	0	94	0	0	154	0	0
Liberty Colorado Springs Central	CO Springs	1,113	18	1.6	1,130	10	0.9	1,110	1	0.1
Liberty Colorado Springs North	CO Springs	495	0	0	560	4	0.7	794	2	0.3
Liberty Colorado Springs South	CO Springs	790	5	0.6	895	10	1.1	977	10	1

Note: AR=American Renal, FMC=Fresenius Medical Care. Facility dialysis-related infection rates are per 100 patient months.
Data are limited to the following access types: fistula, graft, tunneled central line, and non-tunneled central line.
Infection data for dialysis centers with fewer than 50 patient months in a 12-month period are suppressed to protect confidential health information. These dialysis centers have met the reporting requirements.
*** Indicates value not shown due to suppression of infection data.
Source: National Healthcare Safety Network (NHSN) Database.

Clostridium Difficile infections

Overview

Clostridium difficile infections (CDI) are a growing problem in health care. C. difficile is a spore-forming bacteria that can cause symptoms ranging from bloating, diarrhea, fever, and abdominal pain to life-threatening colon inflammation, sepsis and death. Between 2000 to 2009, the discharge diagnosis of CDI in hospitalized patients increased from approximately 139,000 to 336,000[14] and is estimated to cause 14,000 deaths per year.[15] Risk factors for CDI include antibiotic administration, increasing age, duration of hospital stay, and severity of underlying diseases.[16] CDI also may be acquired outside of hospitals in the community, and exposures to other types of health care are also a risk factor. Although 94 percent of CDI are related to health care exposures, 75 percent of health-care associated CDI have their onset outside of hospitals.[17]

Based on the high incidence and potential severity of CDI, Colorado's HAI Advisory Committee added CDI to state reporting requirements for acute care hospitals last year. CDI data became available Jan. 1, 2013. Hospital reported CDI data are classified as hospital-onset (HO), community-onset (CO), and community-onset health care facility associated (CO-HCFA). HO cases are laboratory positive specimens collected more than three days after admission to the facility (i.e., on or after day four). CO include laboratory identified specimens collected in an outpatient location or an inpatient location on days one, two or three after admission to the facility. CO-HCFA cases include specimens collected from patients discharged from the facility four or fewer weeks prior to the current date of stool specimen collection. Data from outpatient locations are not included in this definition. Only laboratory-identified hospital-onset cases are presented in this report.

Over the last two years, the statewide CDI rate for Colorado hospitals has been worse than the national average.

Results

Table 24 presents laboratory identified hospital onset *C. difficile* cases reported by acute care hospitals from August 2013 through July 2016.

Forty-eight acute care hospitals submitted CDI data into NHSN this past year and five hospitals reported zero CDI. Four acute care hospitals had CDI rates better than the national average and seven had rates that were worse. Over the last two years, the statewide CDI rate for all Colorado acute care hospitals combined has been worse than the national average.

Table 24: Number of *Clostridium difficile* Infections and Standardized Infection Ratios in Hospitals – Colorado, August 2013-July 2016

Clostridium difficile Infections in Hospitals (facility-wide inpatient): Aug. 1, 2013 – July 31, 2016													
Health Facility and City		August 2013- July 2014				August 2014- July 2015				August 2015- July 2016			
		No. of Patient Days	No. of Infections	SIR	National Comparison	No. of Patient Days	No. of Infections	SIR	National Comparison	No. of Patient Days	No. of Infections	SIR	National Comparison
Animas Surgical Hospital	Durango	581	0	0	Same	256	0	0	Same	0	***	***	***
Arkansas Valley Regional MC	La Junta	4,057	0	0	Same	3,782	1	0.5	Same	3,746	2	1	Same
Banner Fort Collins Medical Center	Ft. Collins	0	***	***	***	459	0	0	Same	2,449	0	0	Same
Boulder Community Hospital	Boulder	28,197	18	1.1	Same	11,602	3	0.4	Same	7,248	0	0	Better
Boulder Community Hospital-Foothills	Boulder	6,602	4	0.9	Same	24,475	19	1.1	Same	28,062	24	1.2	Same
Castle Rock Adventist Hospital	Castle Rock	7,232	2	0.4	Same	8,626	6	1	Same	8,346	1	0.3	Same
Centura Avista Adventist Hospital	Louisville	10,704	4	0.6	Same	11,132	0	0	Better	10,782	2	0.4	Same
Centura Littleton Adventist Hospital	Littleton	40,718	35	1.4	Same	37,100	38	1.4	Same	35,257	26	1	Same
Centura Penrose St Francis Health	Colorado Springs	61,866	34	0.9	Same	57,890	53	1.4	Worse	49,939	43	1.4	Worse
Centura Porter Adventist Hospital	Denver	51,440	24	0.7	Same	44,185	30	1	Same	35,462	27	1.1	Same
Centura St Anthony Central Hospital	Denver	61,048	39	1.1	Same	62,015	60	1.4	Worse	61,322	64	1.5	Worse
Centura St Anthony North Hospital	Westminster	23,492	17	1.1	Same	18,447	23	1.8	Worse	21,254	13	0.8	Same
Centura St Francis MC	Colorado Springs	31,303	11	0.7	Same	34,142	11	0.6	Same	35,356	7	0.4	Better
Centura St Mary Corwin MC	Pueblo	25,750	5	0.4	Better	23,985	20	1.5	Same	23,185	24	1.8	Worse
Centura St Thomas More Hospital	Canon City	5,535	2	0.8	Same	5,984	4	1.3	Same	5,644	3	1.1	Same
Colorado Plains MC	Fort Morgan	6,436	2	0.5	Same	5,002	0	0	Same	3,220	0	0	Same
Community Hospital	Grand Junction	6,336	5	1.2	Same	7,587	4	0.9	Same	8,612	8	1.5	Same
Delta County Memorial Hospital	Delta	5,332	2	0.8	Same	4,280	3	1.4	Same	45	1	0	Better
Denver Health MC	Denver	98,350	70	0.8	Same	106,394	81	0.8	Same	95,488	82	0.9	Same
Longmont United Hospital	Longmont	28,667	16	0.7	Same	26,741	11	0.6	Same	23,905	11	0.7	Same
McKee Medical Center	Loveland	14,328	5	0.5	Same	14,996	7	0.7	Same	13,012	6	0.7	Same
Medical Center of Aurora	Aurora	73,096	85	1.4	Worse	71,661	98	1.4	Worse	63,106	68	1	Same

Clostridium difficile Infections in Hospitals (facility-wide inpatient): Aug. 1, 2013 – July 31, 2016													
Health Facility and City		August 2013- July 2014				August 2014- July 2015				August 2015- July 2016			
		No. of Patient Days	No. of Infections	SIR	National Comparison	No. of Patient Days	No. of Infections	SIR	National Comparison	No. of Patient Days	No. of Infections	SIR	National Comparison
Medical Center of the Rockies	Loveland	41,109	45	1.5	Worse	40,404	31	1.1	Same	40,500	47	1.5	Worse
Memorial Hospital Central	Colorado Springs	59,427	18	0.5	Better	64,445	40	0.8	Same	65,601	59	1.1	Same
Memorial Hospital North	Colorado Springs	14,739	1	0.1	Better	12,843	4	0.5	Same	14,396	4	0.4	Same
Mercy Regional MC	Durango	12,882	16	2.5	Worse	13,088	12	1.7	Same	13,685	8	1	Same
Montrose Memorial Hospital	Montrose	8,672	4	0.8	Same	8,207	2	0.5	Same	7,396	2	0.4	Same
North Colorado MC	Greeley	52,850	26	0.8	Same	52,187	33	1	Same	48,904	25	0.8	Same
North Suburban MC	Thornton	24,481	17	1	Same	26,629	20	1.1	Same	26,528	24	1.2	Same
OrthoColorado Hospital St Anthony	Lakewood	4,293	0	0	Same	4,436	0	0	Same	5,095	0	0	Same
Parker Adventist Hospital	Parker	24,407	14	1	Same	26,172	24	1.7	Worse	28,454	25	1.6	Worse
Parkview MC	Pueblo	83,433	38	0.5	Better	87,896	27	0.3	Better	74,123	51	0.7	Better
Poudre Valley Hospital	Ft Collins	39,518	32	1.1	Same	44,105	25	0.7	Better	45,050	32	0.8	Same
Presbyterian St Luke's MC	Denver	54,745	56	1.6	Worse	56,387	71	1.7	Worse	56,329	67	1.4	Worse
Rose Medical Center	Denver	43,311	26	0.8	Same	41,788	35	1.1	Same	36,802	31	1	Same
San Luis Valley l MC	Alamosa	5,410	4	1.4	Same	6,084	3	0.8	Same	5,744	4	1.1	Same
SCLH Good Samaritan MC	Lafayette	51,371	47	1.7	Worse	52,822	40	1.5	Worse	52,722	38	1.2	Same
SCLH Lutheran MC	Wheat Ridge	65,362	35	0.8	Same	47,702	49	1.2	Same	45,839	54	1.6	Worse
SCLH Platte Valley MC	Brighton	9,464	2	0.4	Same	8,926	6	1.3	Same	9,003	3	0.7	Same
SCLH St Joseph Hospital	Denver	76,381	61	1	Same	77,609	75	1	Same	78,723	73	1	Same
SCLH St Mary's Hospital	Grand Junction	56,822	28	0.6	Better	59,037	34	0.7	Better	59,482	48	1	Same
Sky Ridge MC	Lone Tree	44,209	45	1	Same	47,789	62	1.2	Same	49,536	52	1.1	Same
St Anthony Summit MC	Frisco	2,329	1	0.8	Same	2,495	1	0.6	Same	2,811	0	0	Same
Sterling Regional MC	Sterling	3,778	1	0.4	Same	4,506	1	0.4	Same	4,072	3	1.2	Same
Swedish Medical Center	Englewood	93,468	108	1.6	Worse	90,032	111	1.6	Worse	84,481	72	1.1	Same
University of Colorado Hospital	Aurora	146,838	163	1.3	Worse	150,959	143	1	Same	161,001	188	1.1	Same
Vail Valley MC	Vail	5,610	2	0.5	Same	5,374	2	0.5	Same	5,849	5	1.4	Same
Valley View Hospital	Glenwood Springs	10,103	4	0.6	Same	11,383	3	0.3	Better	12,165	6	0.7	Same
Yampa Valley MC	Steamboat Springs	5,481	1	0.4	Same	4,611	2	0.6	Same	4,868	8	2	Same

Note: SIR=standardized infection ratio, the ratio of observed to expected infection adjusted for facility risk factors; SCLH=Sisters of Charity of Leavenworth Health System.
National comparisons are based on the indirect adjustment of modeled risk factors applied to total patient days. See "Risk Adjustment for Healthcare Facility-Onset *C. difficile* and MRSA Bacteremia Laboratory-identified Event Reporting in NHSN" (CDC).
*** Indicates value not shown due to suppression of infection data, or no National or historical rate, or an expected count of zero, to which to compare facility rate.
Source: National Healthcare Safety Network (NHSN) Database

Conclusions

Colorado mandated reporting of HAI in 2006. To date, ten annual reports have been submitted to the legislature and public demonstrating a commitment by the Colorado Department of Public Health and Environment and infection prevention professionals to track, monitor and report HAI data. Constant attention is needed to ensure patient safety in all types of health care facilities. Any success in reducing these serious infections will require continued effort from multiple stakeholders including patients and their families, care providers, administrators and state health departments.

Key findings described in this report include the following:

- Of reportable surgeries in Colorado, the three most common surgeries performed continue to be knee replacements (n=15,819 in hospitals, 701 in ASC), breast procedures (n=10,983 in hospitals, 5,840 in ASC) and hip replacements (n=10,611 in hospitals, 379 in ASC).
- Most Colorado health facilities had HAI rates similar to national rates for most reportable HAI.
- This year, the statewide SSI rate for coronary artery bypass surgeries was better than the national average.
- Statewide aggregate SSI rates for colon surgeries, abdominal hysterectomies, and knee replacements done in hospitals were better than national rates over the last four years.
- Statewide aggregate SSI rates for hernia repairs performed in ASC have been better than national rates for the last four years.
- The statewide SSI rate for breast surgeries performed in hospitals was similar to the national average, an improvement from the previous three years, when rates were worse.
- ASC traditionally report fewer SSI than hospitals, which may be due in part to reduced opportunity to conduct post-surgical follow-up with patients and surgeons. Over the last three years, the number of SSI reported by ASC has declined.
- CLABSI rates for all unit and facility types were similar to national rates this year.
- The numbers and rates of dialysis related infections has improved over the last three years.

The statewide aggregate rate for CDI has been worse than the national rate for the last two years. While this report only includes information on a subset of HAI, the information provided can be used as an important indicator of health care quality and infection prevention efforts in Colorado facilities. Beyond the number and rate of HAI for each facility, consumers can see the volume of procedures performed at each facility, which can be an indicator of experience and practice.

Report users should note that the data presented are self-reported by each facility and that data validation studies have been completed thus far only for selected CLABSI, SSI and dialysis-related infections. See Appendix A. It is recommended that conclusions regarding health care quality be made in conjunction with other quality indicators and that consumers consult with doctors, health care facilities, health insurance carriers, health care websites from reputable sources (e.g., Hospital Compare, Colorado Hospital Report Card, or Leap Frog), and their families and friends before deciding where to receive care.

The department will continue its work to reduce HAI in Colorado through various activities, including tracking and publishing HAI data, completing HAI data validation studies, implementing HAI prevention collaboratives, directly observing facility practices, maintaining communication vehicles for HAI-related information and collaborating with internal and external partners committed to patient safety.

We hope facilities will use the data in this report to target and improve infection prevention efforts, and consumers will use these data to make more informed health care decisions.

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Appendix A

HAI data validation studies and infection prevention projects

Data validation studies

As part of a comprehensive reform to address HAI, many states, including Colorado, have mandated reporting to create greater transparency between health care facilities and the public while supporting greater accountability. According to Lin[18], inter-facility comparisons of the data are only valid when the methods of surveillance are uniform and reliable across institutions. The department's Health Facility Infection Surveillance Unit has conducted several validation studies including follow-up validation studies as in table below.

Study Description	Initial Study Year	Follow-up Study Year
CLABSI	2012	2014
Dialysis Events	2012	2014
Hip and Knee Surgeries	2012	n/a
Hernia Surgeries	2012	n/a
Colon Surgeries	2015	n/a
Breast Surgeries in ASC	2015/2016	n/a
Breast Surgeries in HOPDs	2016	n/a
CDI LabID Events	2016	n/a

Central line-associated bloodstream infection (CLABSI)

A CLABSI data validation study completed in May 2012 and published in the American Journal of Infection Control in 2013 found that 33 percent of cases identified by trained reviewers were not reported. A wide variation in surveillance practices and in the application of definitions and criteria also was noted. A follow-up validation completed in July 2014 found only 2 percent of cases were not reported. This improvement was noted along with observed improvement in infection preventionists' knowledge of surveillance definitions and practices.

Hernia surgery surgical site infections (SSI)

A surgical site infection data validation study was completed in 2012. The objectives were to learn how facilities conduct post-discharge surveillance following surgery, assess the accuracy of data reported for risk adjustment, and assess accuracy in which facility staff applied NHSN definitions and criteria. Forty-one facilities were visited (31 hospitals and 10 ambulatory surgery centers) to perform chart reviews of hernia surgeries and SSI reported through NHSN from January through June 2010. Of 438 charts reviewed, two non-reported events were found and eight events were over-reported.

Hip and knee surgery SSI

Twenty-five facilities participated in this study, including 21 facilities that reported at least one SSI during the study period. For each facility, all reported SSI plus an additional 10 randomly selected patient charts (without SSI) were reviewed. A questionnaire was administered to infection preventionists to assess the adequacy of NHSN-recommended surveillance methods and definitions.

An exit interview was completed at the end of each site visit providing another opportunity for on-site education and clarification. The audit found no over or under reported SSI and a solid level of understanding and application of NHSN surveillance methods and definitions by infection preventionists. However, several facilities showed errors in classifying SSI depth (superficial versus deep), which may have been based on incomplete information available in the medical records, and lack of time and resources for additional review or update of SSI once entered in NHSN.

Colon surgery SSI

In a 2015 Colon SSI validation study, 924 charts at 20 facilities were examined. Fifty-two (6 percent) non-reported events and 10 (1 percent) over-reported charts were identified. SSI-organ space events were the most non-reported events identified. This was, in part, due to criteria misinterpretation from IPs who thought a positive blood culture was required to meet criteria for an organ space SSI. One noteworthy finding was the inclusion of 70 ineligible surgeries (procedures with ICD9 codes not listed in the NHSN operative category for colon surgeries). Moreover, common discrepancies occurred with the wound class and scope variables.

Breast surgery SSI in ambulatory surgery centers

Starting in late 2015, staff conducted chart reviews for patients having breast surgeries in 18 Colorado ambulatory surgery centers (ASC). Selected ASC had performed at least 100 breast surgeries in 2014 and were located in the Denver metro area and along the front-range (within 100 miles of Denver; see Table 1). A total of 715 charts were examined (701 females and 14 male) to identify under- and over-reported events and data discrepancies and omissions in events and procedures. No under-reported events were found and one over-reported event was identified because the case did not meet all NHSN criteria for superficial SSI. Fifty-three non-eligible procedures (procedures with ICD9 codes not listed in the NHSN operative category for breast surgeries) were identified. All but one facility reported procedure duration incorrectly, because they were still using outdated protocol definitions. Five facilities failed to enter two denominator forms in NHSN for bilateral procedures, which could artificially elevate their SSI rates. Common discrepancies occurred with wound class, anesthesia class, and type of anesthesia variables.

Breast surgery SSI in hospital outpatient day surgery centers

A comparative study, similar to the one conducted in ASC, for breast surgeries was implemented for hospital outpatient day surgery centers (HOPDs). 509 charts were reviewed at twelve HOPD and yielded two non-reported events, two over-reported events and 25 non-eligible procedures. As expected, there was more post-surgery documentation available for the reviewer at the HOPD than the ASC, which helped identify reporting errors. Moreover, HOPD had electronic health records which contributed to a noticeable difference in discrepant variables reported into NHSN when compared to discrepant variables found with ASCs.

***Clostridium difficile* infection laboratory-identified events**

Twenty facilities were enrolled in a validation study to assess quality and completeness of data entered into NHSN for Clostridium difficile infection (CDI) laboratory-identified (LabID) events for the 2015 reporting year. The study was still underway when this report was published. Seven of the twenty facilities have been audited, and seven non-reported events and no over-reported events

have been identified. All non-reported events were from the same facility, which manually identified LabID events. The other six facilities had NHSN rules and criteria built into their electronic data mining systems to perform standardized identification for CDI LabID events.

Dialysis infections
In 2013, a validation study to assess reporting accuracy of dialysis event data was conducted. Of 65 operating dialysis treatment centers in Colorado, 25 were visited to perform patient chart reviews to identify non- and over-reported events. Of 467 charts reviewed in 25 facilities, 29 percent of events were found to be unreported while 13 percent of events were over-reported.

In 2014, a follow-up validation study was conducted in 24 dialysis facilities. Of 377 charts reviewed, 23 percent of events were non-reported and 4 percent of events were over-reported. In summary, from 2013 to 2014, the number of non-reported and over-reported events declined, and appeared to be related to observed improvements in facility administrators' knowledge and application of surveillance methods and definitions.

Prevention collaboratives

Surgical site infections and *Clostridium difficile* infections
During 2011 to 2013, the Colorado Department of Public Health and Environment, the Colorado Hospital Association (CHA) and Denver Health Medical Center implemented two HAI prevention collaboratives for surgical site infections (SSI) and *Clostridium difficile* infection (CDI). Seventeen and 16 facilities, respectively, participated in the SSI and CDI collaboratives. Participants piloted and implemented new HAI prevention strategies, engaged additional hospital staff (e.g., physicians, environmental services) and shared data in an effort to achieve the following HAI reduction goals:

- ≥ 15 percent reduction in the SSI rate from baseline.
- ≥ 15 percent reduction in CDI rates from baseline.
- ≥ 90-95 percent adherence rates to process measures (dependent upon metric).

The following targets were achieved:

- Most hospitals maintained at least 90 percent adherence to CDI process measures.
- CDI Hospital Onset (HO) rates declined by 14 percent.
- Community-Onset Hospital-Associated (CO-HA) CDI rates declined by 24 percent.
- Combined HO/CO-HA CDI rates reduced by 17 percent.
- Most facilities remained at 95 percent adherence to SSI process measures.
- Some facilities for certain surgeries reduced their SIR from 2009 to 2013 by ≥ 10 percent.
- Most facilities showed a decline in SSI of at least 15 percent in 2013.

Dialysis infections
In 2013-2014, the Colorado Department of Public Health and Environment and the Intermountain End Stage Renal Disease Network implemented a Dialysis Infection Prevention Collaborative. Representatives from 30 outpatient dialysis treatment centers (DTC) across Colorado enacted interventions to improve hand hygiene (HH), conducted observations of HH practices, submitted results of HH audits and continued to submit dialysis event data into NHSN. Results showed declines

in access-related bloodstream infections for both collaborative and non-collaborative facilities and a decline in local access infections for collaborative facilities only.

Dialysis patient education
In 2014-2014, the department received federal funding to implement a Dialysis Patient Education Collaborative that developed a standardized education curriculum that includes key steps in infection prevention, vascular access and general patient care. The education is intended to engage patients in their own care by teaching observation and communication methods that empower them to observe staff technique, ask questions and provide feedback.

Special projects

Hand hygiene partnership
According to the Centers for Disease Control and Prevention (CDC), hand hygiene is the most important measure to prevent the transmission of harmful germs. Studies show that health care workers follow hand hygiene guidelines only about 40 percent of the time19.

The Colorado Department of Public Health and Environment, Telligen (formerly, Colorado Foundation for Medical Care) and the Colorado Hospital Association developed and distributed a new hand hygiene improvement toolkit for providers in a variety of health care settings including nursing homes, hospitals, ambulatory surgery centers, home health, physician offices and clinics[20- 22].

Emerging Infections Program (EIP)
Colorado is one of 10 states in the Centers for Disease Control and Prevention Emerging Infections Program (EIP). The 10-state network comprises a catchment area of approximately 44 million people, and is roughly representative of the U.S. population on the basis of demographic characteristics such as age, gender, race and urban residence, as well as health indicators such as population density and percent at or below the poverty level. The EIP network is a national resource for surveillance, prevention, and control of emerging infectious diseases. EIP activities go beyond routine functions of health departments by:

- Addressing the most important issues in infectious diseases and selecting projects that the EIP network is particularly suited to investigate.
- Maintaining sufficient flexibility for emergency response and addressing new problems as they arise.
- Developing and evaluating public health interventions and ultimately transferring what is learned to public health agencies.
- Incorporating training as a key function of EIP activities.
- Giving high priority to projects that lead directly to the prevention of disease.

Colorado EIP HAI projects include a survey to identify the prevalence of HAIs, population-based active surveillance of pathogens of interest including Clostridium difficile (Denver metropolitan area), carbapenem-resistant Enterobacteriaceae (statewide) and Acinetobacter (Denver metropolitan area), and other HAI projects.

Dialysis infection prevention

In 2016, the department hired a dialysis infection preventionist to work with dialysis treatment centers to improve infection reporting and prevention. Part of the intervention included the distribution of quarterly feedback reports to each facility that allowed them to see their facility's rates of access-related bloodstream infections (ARB) and local access infections (LAI) compared to every other Colorado dialysis facility and the statewide aggregate rate. In addition, site visits to assess infection reporting and prevention practices and provide education and resources were conducted for selected facilities. Selected facilities were those having ARB rates of at least 2.0 or at least six ARB during the six-month timeframe examined. By December 2016, the infection preventionist visited 41 of 71 facilities, including 12 that had either high ARB rates or counts during July to December 2014; nine that reported zero infections from July to December 2014 and 20 others located near the aforementioned units. The focus of the visits was to:

Engage leadership from large, small and independent dialysis facilities.

Assess staff members' ability to access NHSN and their knowledge and competence in event surveillance and reporting.

- Train staff on NHSN analysis features and report generation.
- Assess use of CDC interventions to reduce infections and provide training on CDC interventions.
- Provide additional infection prevention educational resources as needed (e.g., information regarding CDI, HCV, and use of appropriate PPE).

Preliminary results demonstrate declines in ARB and LAI from before to after the intervention began.

Appendix B

Standardized infection ratio overview

The Standardized Infection Ratio (SIR) is a risk-adjusted summary measure used for central line-associated bloodstream infection (CLABSI) data, umbilical catheter associated infection data (in neonatal critical care units only), surgical site infection (SSI) data and dialysis-related infection data. The SIR describes a facility's performance, taking into account individual facility's patient population risk. The SIR is the number of infections reported by the facility divided by the expected number of infections. The expected number of infections is determined by historical data collected by the NHSN as well as an individual facility's patient population.

Interpretation of the SIR is done by comparing a facility's value to one (observed and expected number of SSI are the same). In other words, the number of infections is what was expected based on the national average. If the SIR value is greater than one, there are more infections than expected, and if the SIR value is less than one, there are fewer infections than expected.

The statistical significance of the difference between the observed and expected SSI based on the national average is tested using a Poisson test. A p-value is computed from the test and helps determine if the difference in the HAI rate is due to chance alone. If the p-value is greater than or equal to 0.05, then there is no significant difference (SAME) between the facility's HAI count and the expected count based on the national rate.
If the p-value is less than 0.05, then the difference is statistically significant, and the value of the SIR determines whether the facility is better than or worse than the national average. If the SIR is greater than one, then the facility has significantly more CLABSI than were expected based on the national average (WORSE). The converse also applies where if the SIR is less than one, the hospital has significantly fewer CLABSI than were expected (BETTER).

Appendix C

Glossary of terms and abbreviations

Access-related bloodstream infection (ARB): The presence of bacteria in the blood verified by culture with the source identified as the vascular access site or is unknown.

Ambulatory Surgery Center (ASC): A facility which operates exclusively for the purpose of providing surgical services to patients not requiring hospitalization.

Bloodstream infection (BSI): An infection of the blood.

Central line (CL): A flexible tube (intravascular catheter) that terminates at or close to the heart or in one of the great vessels.

Central line-associated bloodstream infection (CLABSI): A primary bloodstream infection (BSI) in a patient that had a central line within the 48-hour period before the development of the BSI.

Central line-associated bloodstream infection (CLABSI) rate: The total number of central line-associated bloodstream infections divided by the number of central line days multiplied by 1,000.

Central line days (device days): A daily count of patients with a central line in place is performed at the same time each day.

Coronary artery bypass graft surgery (CBGB): A surgical treatment for heart disease in which a vein or artery from another part of the body is used to create an alternate path for blood to flow to the heart bypassing a blocked artery.

Critical care unit (CCU): A nursing care area that provides intensive observation, diagnosis, and therapeutic procedures for adults and/or children who are critically ill.

Critical access hospital (CAH): A designation given to certain rural hospitals by the Centers for Medicare and Medicaid Services to **reduce financial vulnerability** and **improve access to healthcare** by keeping essential services in rural communities. A CAH must have 25 or fewer acute care inpatient beds, be more than 35 miles from another hospital, maintain an average length of stay of 96 hours or less for acute care patients, and provide 24/7 emergency care services.

Dialysis event (DE): An event for a dialysis patient involving any one of three possible scenarios: 1) hospitalization; 2) intravenous (IV) antimicrobial start; or 3) a positive blood culture. Dialysis event reporting involves *outpatient* facilities only.

Fascia: A thin layer of connective tissue covering, supporting, or connecting the muscles or inner organs of the body.

Great vessel: Based on NHSN criteria for reporting central line BSI, the following are considered great vessels: aorta, pulmonary artery, superior vena cava, inferior vena cava, brachiocephalic veins, internal jugular veins, subclavian veins, external iliac veins, common iliac veins, common femoral veins, and in neonates, the umbilical artery and vein.

Healthcare-associated infection (HAI): An infection of a patient that occurs in a health care setting which was not present or incubating at the time of admission and is not related to a previous admission.

Hip replacement surgery: An elective procedure for people with severe hip damage or pain related to chronic osteoarthritis, rheumatoid arthritis or other degenerative processes involving the hip joint.

Implant: A nonhuman-derived object, material, or tissue that is permanently placed in a patient during an operation. Examples include: heart valves, metal rods, mesh, wires, screws, cements, hip replacements and other devices.

Infection: An invasion of the body tissues by an infectious agent.

Infection preventionist (IP): A health professional that has special training in infection prevention.

Inpatient: A patient whose date of admission to a health care facility and the date of discharge are different calendar days.

IV antimicrobial start: The first dose of a medication given intravenously to kill microscopic infectious organisms such as bacteria and viruses in the body.

Knee replacement surgery (arthroplasty): An elective procedure for people with severe knee damage and pain related to osteoarthritis, rheumatoid arthritis, and traumatic arthritis.

Local access infection (LAI): Pus, redness, or swelling of the vascular access site without the presence of access-associated bacteremia, patient hospitalization, or initiation of IV antimicrobials.

Location of attribution: The inpatient location where the patient was assigned on the date of the bloodstream infection (BSI) event, which is further defined as the date when the first clinical evidence appeared or the date the specimen used to meet the BSI criteria was collected, whichever came first.

Long-term acute care hospital (LTAC): A specialty care hospital that cares for patients with serious medical conditions that require intense, special treatment for long periods of time (an average length of stay is 25 days).

Metric: A measurement for calculating health outcomes. There are both process metrics that measure adherence to standard health care quality processes, and outcome metrics that measure the number of patients affected by specific medical treatments.

National Health Care Safety Network (NHSN): NHSN is a secure, internet-based surveillance (monitoring and reporting) system managed by the Centers for Disease Control and Prevention (CDC) Division of Healthcare Quality Promotion.

NHSN operative procedure: A procedure that meets the following criteria: 1) performed on a patient who is a NHSN inpatient or outpatient; 2) takes place during an operation; and 3) included in the NHSN operative procedure categories.

Neonate: An infant less than or up to 30 days of age.

Neonatal critical care unit (NCCU): Patient care area providing care to most critically ill infants.

Outpatient: Patient whose date of admission to the facility and date of discharge are the same day.

Patient fays: The total number of inpatients for a particular unit determined at the same time each day for every day of the month recorded as a total sum for the month.

Permanent central line: A catheter that is tunneled under the skin on the chest wall and includes certain dialysis catheters (e.g., Hickman, Groshong, and Broviac) and implantable venous access ports (e.g., Port-a-Cath). Some dialysis patients may still have a port used for dialysis; however, most do not use this type of access due to the increased risk of infection.

Population: The total number of inhabitants of a geographic area or the total number of persons in a particular group (e.g., the number of persons engaged in a certain occupation).

Prevalence: The number or proportion of cases, events or attributes among a given population.

Rate: An expression of the relative frequency with which an event occurs among a defined population and specific time period calculated as the number of new cases or deaths during a specified period divided by either person-time or the average (mid-interval) population.

Risk: The probability that an adverse event will occur (e.g., that a person will be affected by, or die from, an illness, injury, or other health condition within a specified time or age span).

Risk adjustment: Accounts for differences in patient populations, enabling hospital comparisons.

Risk-adjusted rate: For surgical site infections, the risk-adjusted rate is based on a comparison of the actual (observed) rate and the expected rate if nationwide the patients had the same distribution of risk factors as the hospital. For CLABSI, the adjusted rate is a comparison of the

actual rate and the expected rate based on national rates for each ICU or within birth weight categories for neonates.

Risk factor: An aspect of personal behavior/lifestyle, environmental exposure, or hereditary characteristic associated with an increased occurrence of a disease, injury, or other health condition.

Standardized infection ratio (SIR): A risk-adjusted summary measure that accounts for the type of procedure and risk category. The SIR provides an overall score for a procedure at each health facility based on the expected number of infections after adjusting for the risk category.

Surgical site infections (SSI): Infections that are directly related to an operative procedure. Some SSI are minor and only involve the skin or subcutaneous tissue. Other SSI may be deeper and more serious.

Surgical site infection rate: Surgical site infection rates per 100 operative procedures are found by dividing the number of SSI by the total number of specific operative procedures within a given reporting period. The results are then multiplied by 100. These calculations are performed separately for each type of surgical procedure. They are listed by risk level.
Symptom: Any indication of disease noticed or felt by a patient.

Temporary central line: A central line that is not tunneled.

Trend: Movement or change in frequency over time, usually upwards or downwards**.**

Validation: A method of assessing the completeness and accuracy of reported HAI data.

Vascular access infection: An infection that is either a local access infection or access-related bloodstream infection.

Wound class: An assessment of the likelihood and degree of contamination of a surgical wound at the time of the operation. The four classes are clean, clean-contaminated, contaminated, and dirty.